

PACIFIC SEABIRDS



A Publication of the Pacific Seabird Group

Volume 24 Number 2

Fall 1997

Dedicated To The Study And Conservation Of Pacific Seabirds And Their Environment

The Pacific Seabird Group (PSG) was formed in 1972 out of a need for better communication among Pacific seabird researchers. The Group coordinates and stimulates the field activities of members involved in research and informs its members and the general public of conservation issues relating to Pacific Ocean seabirds and the marine environment. Group meetings are held annually and the PSG publication, *Pacific Seabirds* (formerly the *PSG Bulletin*), is issued biannually. Current activities include involvement in seabird sanctuaries, coastal surveys, seabird/fisheries interactions, and legislation. Policy statements are issued on conservation issues of critical importance. Although PSG's primary area of interest is the westcoast of North America and adjacent areas of the Pacific Ocean, it is hoped that seabird enthusiasts in other parts of the world will join and participate in PSG. PSG is a member of the U. S. Section of the International Council for Bird Preservation. Annual dues for membership are \$20 (individual and family); \$13 (student, undergraduate and graduate); and \$600 (Life Membership, payable in six \$100 installments). Dues are payable to the Treasurer (see Membership page for details and application).

Pacific Seabirds

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FORUM

MORTALITY OF SEABIRD BIOLOGISTS

Mark J. Rauzon

Josh Nove, age 23, disappeared into Mother Goose Lake, on the Alaska Peninsula, on July 3, 1997. He was attempting to capture Mew Gull chicks in shallow water when he apparently stepped into a deep hole and never surfaced. He was wearing rolled down hip boots that probably filled with 42 degree, silt-laden water. To date, searchers have not found his body. Josh Nove was a lifelong birder who volunteered for the USFWS. He was having the experience of a lifetime, his first field work in Alaska, fresh from college, and just beginning his career in seabirds. Our deepest sympathies go out to his spirit in Mother Goose Lake and to his family in Ipswich, Massachusetts.

In a Twilight Zone manner, when I saw the headline "Volunteer bird biologist vanishes," I quickly scanned the facts to see if it were me - not Josh - who vanished. This summer, I was also a volunteer biologist, twice the age of Josh, and having the time of my life in the Bering Sea. However I had started the field season with apprehension. With only a two-minute survival time in the cold water with no local Coast Guard to respond, I resigned myself to knowing a boating accident is a one-way ticket.

So, having created a psycho-drama in my mind, I got the chance to manifest it in reality and I fared poorly. In mid-June, I

spent several uncomfortable hours sitting in an aluminum boat. The engine had died and landfall at St. Lawrence Island was far off in the fog. Luckily, seas were calm so Bert Oozevasuk and Caleb Pungowiwi could attempt to restart the engine. It was midnight and though the sun had not set, a gray gloom surrounded us. El Niño notwithstanding, the ocean chill crept into the metal boat and into my feet and butt. I got into this situation after a previous long night of boating. I was exhausted, dehydrated and cold; it was impossible to fit on any more clothes. In a poor frame of mind, I contemplated my mortality. I could see hypothermia on the horizon, an hour or two away. I felt a seed of panic, not unlike experiencing heavy air turbulence and fear . . . "so this is how I'm going to go." To combat the mind chatter, I chanted a mantra - Om Mani Padmu Hum. Oh, mama, papa help me!

It worked, and after many fits and starts, so did the engine. We made to shore. My Yupik colleagues evidently had a different experience, for they knew they would make it back. I was the disbeliever.

In subsequent contemplation on the long days on the ancient island of St. Lawrence, surrounded by bones of marine mammals and, not infrequently, the bones

of humans, I appreciated just how crazy our profession really is. We put ourselves in some of the riskiest situations in to order to get close to seabirds, creatures so alien from our land mammal world. To study them, we mimic their modes of transport, we fly in low level aircraft, at slow speeds, over icy oceans, far from land. We power out on boats, small and large, tossed by the sea, throwing up and expose our skins to ultraviolet-laden light, dehydrating and salting away like pemmican. We cling to cliffs of rotten rock and muddy soils, or stand in the darkest hours under a towering redwood craning our necks. The risks are real and it is fortunate that Poseidon, Neptune, Kane, Mater Cara, Queen of the Ocean, protects us most of the time.

That's why the passing of Josh Nove is so poignant. It could have been any of us at many different points in our careers. I choose to believe that Josh's last name, Nove, suggests his special fate. Nove, or Nova, is a passing star whose brightness is intense and sudden, then quickly fades away. Josh's lesson to us is to redouble our efforts to save seabirds, and to have the experience of a lifetime every time we are in the field.

By *Mark J. Rauzon*, Post Office Box 4423, Berkeley, California 94704, USA

WITH FRIENDS LIKE THESE, WHO NEEDS ENEMIES?

Sierra Club Frightens A Recalcitrant Department of Interior

Craig S. Harrison

The Pacific Seabird Group has long advocated enforcing the Migratory Bird Treaty Act in the USA's entire 200-mile Exclusive Economic Zone. The U.S. Department of Interior has refused to enforce the Act in USA waters beyond the 12-mile territorial sea because of a poorly reasoned legal opinion authored by Donald J. Barry, Interior's Solicitors' Office, during President Carter's administration. The Barry opinion essentially rescinded the Migratory Bird Treaty Act for a 188-mile band of waters offshore of the At-

lantic and Pacific coasts, the Hawaiian Islands and Puerto Rico. As reported in *Pacific Seabirds* 23(2): 14, FWS enforcement officers found their hands were tied when they learned of intentional and wanton destruction of seabirds by U.S. fishermen in Alaska that took place more than 12 miles offshore.

In recent years PSG, assisted by the National Audubon Society and the American Bird Conservancy, seemed to be making progress on this issue. FWS officials indicated that the Solicitors' Of-

fice now concedes that the Barry opinion is wrong. PSG had drawn Interior's attention to the negotiation report for the 1973 USA-Russia Migratory Bird Treaty in which the USA delegation stated the treaty should protect birds 200 miles offshore.

In spring 1996, PSG wrote to Secretary of the Interior Bruce Babbitt, Attorney General Janet Reno and Under Secretary of State Timothy Wirth to request that Interior reverse the Barry opinion and enforce the Migratory Bird Treaty Act

throughout the Exclusive Economic Zone. Secretary Wirth immediately responded that Interior would make a decision soon, while the Department of Justice declined to render any opinion while Interior was considering the matter. Then during summer 1996 PSG was quietly informed that the Clinton administration did not want any pesky environmental issues to interfere with the on-going national elections. It seemed to be saying "we haven't done anything on this issue for four years, but if we get four more we'll do something - trust us."

Another year has now passed without action. Interior's current excuse for inertia is two law suits filed by the Sierra Club. Those suits invoked the Migratory Bird Treaty Act and essentially asked the courts to shut down logging in the Chattahoochee and Oconee National Forests, Georgia, and in the Ozark National Forest, Arkansas, because some birds die during logging activities. The Sierra

Club's national policy opposes allowing a single tree to be taken from a national forest. These suits, understandably, engendered fierce resistance from a U.S. Forest Service that the Sierra Club threatened to put out of business. Cornered by the fact that at least one bird will be "taken" by any forestry operation, Attorney General Reno's Justice Department fashioned a creative defense. It argued that the Act does not apply to federal agencies. This argument has won in both circuit courts, and exempts the federal government from protecting birds as required by its treaties with Canada, Mexico, Japan and Russia.

The Sierra Club has succeeded in the following. Its attempted end run around the legislative process to establish sweeping new forest policies by court order has reversed decades of conservation policy under the Migratory Bird Treaty Act. Federal agencies no longer apply for permits when they take birds.

Not only did the Sierra Club worsen bird conservation, Interior is so terrified by the Sierra Club's litigation that years of work on extending the Migratory Bird Treaty Act to the Exclusive Economic Zone is compromised. The infamous Donald J. Barry, whose legal opinions created the problems for seabirds in the Exclusive Economic Zone 15 years ago, is now the Assistant Secretary of the Interior for Fish and Wildlife and Parks. Some conservationists think Barry will finally deliver for bird conservation in his lofty position. Just don't bet PSG's endowment on it - countless officials in federal natural resource agencies come to their jobs to do good but ultimately only do well for themselves.

By **Craig S. Harrison**, 4001 North Ninth Street, Apartment 1801, Arlington, Virginia 22203 USA



Drawings courtesy of Mr. Yoshitaka Minowa, Japan

LIFETIME ACHIEVEMENT AWARDS

PSG HONORS ITS FOUNDERS: LIFETIME ACHIEVEMENT AWARDS FOR BOURNE, KING AND BARTONEK

Craig S. Harrison and George J. Divoky

The Pacific Seabird Group (PSG) presented Lifetime Achievement Awards to its founders William R.P. Bourne, James G. King and James C. Bartonek at its annual banquet in Portland, Oregon, on January 11, 1997. Thanks to the vision and wisdom of these three gentlemen, combined with a good dose of luck, the Pacific seabird research community was spared from becoming a mere committee of the American Ornithological Union. PSG presented these awards to help us remember PSG's early institutional history, and to honor those individuals who made it possible.

Major events during the period 1965-1975 created conditions that called for increased communication among seabird biologists and elevated efforts by those concerned with seabird conservation and management. In 1965, the British founded The Seabird Group. Their relatively early realization of a need for a dedicated seabird group can be traced to the high interest of the British public in birds generally, and the many colonies on the British coast that are readily accessible to scientists and birders. The following year the International Ornithological Congress formed the International Seabird Committee at its meeting in Oxford. That same year The Seabird Group held its first meeting (see Bourne, "Seabird Groups," p. 54).

Soon oil spills and exploration began to provide a major impetus for increased cooperation among seabird biologists. In 1967, the seabird mortality associated with the *Torrey Canyon* spill in the approaches to the

English Channel brought international attention to the deadly impacts of oil on seabirds. In 1968, a spill at Santa Barbara, California, and scenes on television of grebes covered with oil focused public attention on Pacific seabirds. The discovery of vast oil reserves at Prudhoe Bay that same year became a major concern to the North American community of scientists and conservationists. Prudhoe Bay oil could be transported by tanker either through the Northwest Passage to east coast ports or along the Pacific coast. Either route potentially threatened seabird populations that had not even been censused. In 1969, the difficulties encountered in the Arctic pack ice by an empty supertanker travelling from the east coast to Prudhoe Bay showed that Alaskan oil would likely be transported along the Pacific marine

corridor.

In 1970, Congress enacted the National Environmental Policy Act, which required federal agencies for the first time to consider the environmental consequences of their proposed actions. This legislation required the preparation of environmental impact statements for leasing the federal outer continental shelf lands for oil exploration and development, and led to extensive studies of seabirds. That year President Nixon established by executive order the U.S. Environmental Protection Agency and reorganized the federal government's natural agencies to form the National Oceanic and Atmospheric Administration and the U.S. Fish & Wildlife Service (previously the Bureau of Sport Fisheries and Wildlife).

Beginning in 1971, the three people that PSG has honored with Lifetime Achievement Awards initiated activities that would lead to the founding of PSG. Jim King went to Scotland for a waterfowl meeting and ended up spending much time with Bill Bourne who had been instrumental in forming The Seabird Group six years earlier (see the accompanying article by King, p. 57). King returned to Alaska and in 1972 discussed forming a west coast seabird group with Jim Bartonek, who was then completing the environmental impact statement for the Trans-Alaska Pipeline. Bartonek detailed what was known (and not known) about seabird populations between Valdez, Alaska, and ports in Washington, Oregon and California. In late 1972, at a Western Society of Naturalists meeting in



Craig Harrison observes as W.R.P. Bourne admires the Lifetime Achievement Award plaque presented to him at the Pacific Seabird Group annual meeting in Portland, Oregon, 1997.

LIFETIME ACHIEVEMENT AWARDS

Arcata, California, Michael Scott held a seabird symposium at which Bartonek suggested the forming of PSG and received enthusiastic support from the symposium attendees. While the success of PSG is due in large part to the vision of these three men it also was assisted by a number of political events in the early 1970s. Congress enacted the Alaska Native Claims Settlement Act late in 1971, and in 1972 Bartonek and King spent much time determining which parts of the Alaska coast, especially seabird colonies, should be designated national wildlife refuges. In 1973, the Arab oil embargo encouraged the United States to develop domestic sources of oil. The following year President Nixon ordered that the outer continental shelf be opened to oil development, which began a massive research program in 1975 on the biota of all Alaskan waters. This program brought to Alaska (and to seabird biology) many of the *dramatis personae* in PSG's early years.

While the formation and early activities of PSG were driven largely by political events and management needs, the academic environment of the early 1970s also contributed to the success of PSG. The group of people finishing their doctorates on seabirds near the time of PSG's formation was impressive in number and quality. It included David Ainley, Dan Anderson, Pat Baird, Dee Boersma, Pat Gould, George Hunt, Dave Manuwal, Mike Scott and Spencer Sealy. This cohort was important not only for their own contributions to early (and in many cases later) PSG meetings, but also for the people they trained, inspired, mentored and employed.

Since the early 1970s PSG has functioned as a catalyst for advancements in seabird science and conservation. Few of us believe that as much would have been accomplished without an independent organization devoted exclusively to these pursuits, nor would so many of us have enjoyed our collective friendship and collegiality in these endeavors. PSG hopes that drawing attention to the giants of our past will inspire today's future giants to walk in their footsteps and contribute to PSG. Getting outside of the day-to-day work in an agency or department and helping to shape the development of science and conservation policy in a larger landscape can be among the most rewarding tasks of any career.

William R.P. Bourne

Bill is one of the most interesting people you can meet. An enigma to many, his acid tongue and barbed pen are legendary.

In a review of his career in *British Birds* 71:123-125 (1978), David Jenkins and George Dunnet said that "Stories of his energy, knowledge, eccentricity and unpredictability are probably mostly true." They describe Bourne as "frequently irascible and verbose;" and observed that he "continues to be a thorn in the flesh of the Establishment." Craig Harrison experienced being on the receiving end of such correspondence, which he now acknowledges was probably deserved. Yet Bill has international circle of true friends, and a genuine interest in the young and newcomers in the field.

Perhaps Bill exemplifies the maxim that sometimes your best friend is the one who tells you something that you do not want to hear. There is no doubt that when Bill has pontificated publicly about an issue his motivation is to advance science or conservation and, unlike all too many, not his career. Indeed, most of Bourne's work on seabirds has been self-funded or voluntary - his vocation has been a medical doctor since Oxford University refused to accept his doctoral dissertation because it was in the wrong form.

One of Bourne's rare qualities is a talent for founding organizations (see Bourne, "Seabird Groups," p. 55 for further information). As an undergraduate student in the early 1950s, he helped stimulate the resurgence of Cambridge Bird Club. He founded the Cyprus Ornithological Society (1957-58). He proposed founding The Seabird Group in 1961, launched it in 1965, and served as its Secretary until 1978. Bill also served as the first secretary of International Ornithological Congress' Seabird Committee.

Bourne's scientific accomplishments are legion. He has been involved in the recognition of three new seabird species; the description of three new races; and the re-discovery of several lost species. He has written voluminously in the scientific literature - literally hundreds of articles. His report on the birds killed by oil from the Torrey Canyon in the Irish Sea in 1969 was a seminal work in this area. His publications on the Chagos Archipelago, Indian Ocean, were among the first to recognize that the biggest threat to many tropical species is the seemingly mundane problem of introduced species, such as rats in breeding colonies. When Craig Harrison first met Bill at the 1982 International Council for Bird Preservation World Conference in Cambridge, England, Bourne expressed a frustration known by most biologists when he suggested self-publishing a volume of

his work entitled "Unpublished on Five Continents." "It will be a rather thin volume," he hastened to add.

Besides advancing an understanding of oil and seabirds, Bourne has been instrumental in many conservation projects. His efforts helped to save Aldabra Atoll, Indian Ocean, from development as a military base; the Loch of Strathbeg (now a Royal Society for the Protection of Birds reserve) from becoming the largest North Sea gas terminal; and Henderson Island (now a World Heritage Site) from becoming a private estate.

Bill now lives with wife Sheila in Aberdeen, Scotland where he can keep an eye on seabirds and the oil developments in the North Sea. When asked if he was now retired, he replied, "I've never been properly employed, so I can't really describe myself as retired." We concur with Jenkins and Dunnet that this remarkable man is an "original and commanding character in an era when it is fashionable to conform."

James G. King

Jim describes himself as a waterfowl biologist and pilot. In his "retirement," he maintains the waterfowl propagation and bird rehabilitation facility next to his home on Branta Road, Juneau, that he and his wife Mary Lou have operated since 1965. When his three children and innumerable grandchildren aren't keeping him busy, he flies waterfowl surveys and functions as PSG's elder statesman on the Public Advisory Group to the Exxon Valdez Oil Spill Trustee Council. Jim's direct and practical approach has gained confidence of the entire Public Advisory Group, especially natives.

Born and raised in Maine, Jim has lived Alaska since 1949. He attended Washington State College, earning a degree in wildlife management. King joined FWS as a game management agent in 1951, holding that position until 1962 when he became the refuge manager in Yukon Delta and the Bering Sea Islands. As Jim describes (King, p. 57), seeing the seabird colonies at Cape Newenham, Chukchi Sea, opened his eyes to the tremendous seabird resources in Alaska. From 1964 until his retirement in 1983, Jim was Supervisor of the Alaska Waterfowl Investigations. He flew 500,000 miles of aerial surveys, including many with Jim Bartonek.

Jim regards his inspiration with Bill Bourne and Jim Bartonek to found PSG as a detour in his career in the biology and management of waterfowl, swans, and bald eagles. He was very active in PSG's early

LIFETIME ACHIEVEMENT AWARDS

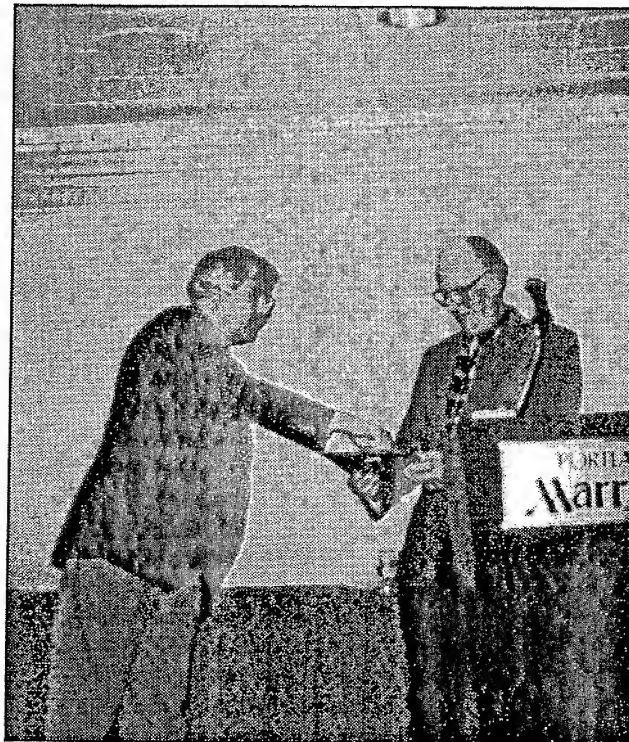
days, giving a paper at the first PSG Conference and serving as editor for volumes 5 and 6 of the PSG Bulletin (1978-1979). He has published numerous papers, including (with Gerry Sanger) his oil vulnerability index for marine birds in 1979.

In addition to PSG's Lifetime Achievement award, Jim has received conservation awards from the National Audubon Society, New Hampshire Wildlife Federation, and the Chevron Conservation Award. To all who have had the privilege, Jim is a delight to work with, and greatly encouraged PSG's greater involvement in conservation issues during the past several years. We are all very grateful to him for taking Bill Bourne's inspiration and working with Jim Bartonek to make PSG a reality.

James C. Bartonek

Jim is a Westerner - born in Utah and received his Ph.D. at University of Wisconsin under Joe Hickey. Studying under Hickey, who was a prominent conservationist, likely influenced Jim greatly regarding how he would apply his serious interests in science. Jim's primary interest has always been waterfowl biology and management. Soon after receiving his doctorate, Jim joined the U.S. Fish & Wildlife Service's Northern Prairie Wildlife Research Center in North Dakota where he studied waterfowl in prairie potholes.

In the late 1960s, Jim began summer bird surveys in Alaska, which lead to his move to Fairbanks in 1970. He did aerial surveys with Jim King, and met and hired George Divoky as a U.S. Fish & Wildlife Service biologist in 1972. Jim's job description did not include seabirds, but the looming oil development and vulnerability of seabirds were issues that he knew needed to be addressed by the federal government. Jim King has written (see King, p. 57) of



James G. King receives the Lifetime Achievement Award plaque from Craig Harrison at the Pacific Seabird Group annual meeting in Portland, Oregon, 1997.

his fateful trip to Scotland in December 1971 where he met Bill Bourne. In spring 1972, King suggested to Bartonek that an analogous organization to The Seabird Group - the Pacific Seabird Group - be formed in the western United States. Jim immediately saw the wisdom of King's suggestion, and recruited George Divoky to begin the organizational work. George immediately cribbed by-laws from the Wildlife Society, using the British term "Executive Council" as the name of PSG's board of directors.

In 1972, Bartonek and Leroy Sowls presented "Seabirds: Alaska's Most Neglected Resource" at the North American Wildlife Conference. This paper provided

a much-needed vision of seabird research in Alaska that garnered attention from those who make funding decisions in the federal government. In early 1975, FWS asked Bartonek and David Cline to write four proposals for the Outer Continental Shelf Environmental Assessment Program over a long weekend. These proposals were funded by the FWS' Office of Biological Services beginning July 1, 1975, and allowed Bartonek and Cline to build a tremendous team of young seabird biologists. Bartonek sought bright, energetic, independent biologists who could carry the ball with a minimum of parenting. He urged each to join PSG. Bartonek also urged his biologists to publish the results of their studies in peer-reviewed journals, and to be wary of the elements of FWS that he described as "one of the great spawning grounds of mediocrity in the federal government." During the heady days of 1975-78, the Office of Biological Services had its own office in Anchorage, and an unmatched *esprit-de-corps*.

Jim was part of the team of FWS biologists who represented the United States in the negotiations for the USA-Japan Migratory Bird Treaty in 1977, which includes important provisions for the protection of seabirds in both nations. In late 1977, Jim left Alaska to take a job as the Flyway Biologist in Portland, Oregon, where he could return to his beloved waterfowl. Jim retired from FWS in 1996.

PSG wishes its founders every success. We thank them for all that they have done for PSG and seabirds, and for the inspiration they have provided for us to deal with current and future issues facing Pacific seabirds.

SEABIRD GROUPS

William R.P. Bourne

When the current seabird groups were founded they were pioneer bodies, which by definition had no past history, while most of the things that they did were new. Now that they have become established it seems time to consider their development, if only to work out what to do next.

It has been found that at most of the good seabird sites in the world there are piles of bird remains left by past seabirders. In the largest of these, in the caves of the limestone Rock of Gibraltar projecting into the entrance to the Mediterranean, human remains were found alongside those of the Great Auk in the last century, which subsequently proved to belong to the first example of Neanderthal Man. It seems questionable whether he was one of the cooks or a sibling species who formed part of the meal, but examination of our colleagues suggests that there may still be primitive types amongst us. If so, seabird groups must have tens or hundreds of thousands of years' priority over all other recorded ornithological activities. Modern men do not appear to have added much at first, apart from including Great Auks among their characteristic graffiti in caves, and it seems debatable whether their behavior is an improvement.

Eventually the Classical Greeks invented Civilization, a way of life where the men indulge in athletic pursuits such as fowling all day, and drinking at "symposia" all night, while the women and slaves do the work. The head of the first university, Aristotle, recorded much information probably overheard at these symposia, some relating to birds. Unfortunately, as usual with academics, his informants appear to have spent little time in the field themselves, and only supplied garbled accounts of what they heard, which they cannot have checked with the observers. Following over two millennia of transcription and amendment most of the birds reported are unidentifiable, though this has not prevented modern academics from trying to identify them, and perpetuate their names in the scientific nomenclature. For example, Linnaeus used the name *Diomedea*, first applied to Cory's Shearwater, for another genus including the Wandering Albatross and Jackass Penguin.

Once properly organized by Alexan-

der, the Greeks soon conquered most of the known world. They were enslaved in their turn by the Romans, crude people only interested in birds for sport and food, who made the Greeks do their bookwork while they watched Christians being fed to lions. Eventually they ran out of lions, and the Christians took over just as barbarians from the east arrived at the gates. While some southern Christians survived, the northern ones had to take refuge on rocks off the west coast of Ireland. As a result of the experience gained in supplying such strongholds they soon became great seamen in their little boats (which they still use) called "Curraghs," and also occupied the Faroe and Westmann islands (named after them) until the arrival of the Northmen. In the first half of the sixth century the greatest of them, Brandan (or Brendan) the Navigator, also sailed on past a miraculous "Isle of Birds," (possibly Funk Island?) to locate a new land to the west, long known on maps as "St. Brandan's Isle" until it was renamed in honor of the first person to write it up properly - an Italian, Amerigo Vespucci. This demonstrates that if you wish to receive credit for your discoveries you must make sure you publish them first.

A further literary problem arose when the Iberians then persuaded the Pope to divide the new lands that were now being discovered between them, the Portuguese taking the eastern and the Spaniards the western hemispheres. They then imposed a blackout on news about them, so the English, Dutch and French who also wished to get in on the act responded by publishing everything they could find out about them. These narratives, especially Richard Hakluyt's collected *Principal Navigations, Voyages and Discoveries of the English Nation of 1589*, make wonderful reading, and contain important early information about seabirds (including once more much of what we know about the Great Auk), either as sources of food or guides to navigation. Much of this information (and anything else concealed in the Spanish archives in Seville) still requires reappraisal in the light of modern knowledge.

Eventually the British were so impressed by an account of a piratical trip round the world at the end of the seventeenth century by William Dampier that

he was sent to discover and survey the east coast of Australia. Unfortunately having little influence, he was only given a poor vessel and crew, and had to turn back after finding New Britain. His *Roe-buck* sank off Ascension Island on the way home, possibly introducing rats. Subsequent voyages did little better, until the Royal Society demanded observations of the transit of Venus from Tahiti in 1769. A simple sailor named James Cook, who had made surveys of the Gulf of the St. Lawrence permitting the conquest of Canada, was put in charge. He took the leading young amateur scientist of the day, Sir Joseph Banks, with an array of other talent. They went on to discover New South Wales, and returned with so many results that they are still being written up. He was then sent on two more voyages notable among other things for the possible collection of Murphy's Petrel off western North America some two centuries before noticed by the natives (Bourne 1995). Finally Cook got careless and was killed in Hawaii, so know when to retire.

One of the unpublicized results of Cook's voyages was the conversion of the misnamed *Silent Service* into naturalists. Many of the specimens and drawings Cook brought home were actually assembled by his crews, whose journals are full of references to birds. This explains why in the following century, by which time the Royal Navy was regularly surveying all the oceans, young scientists accompanying subsequent expeditions such as Charles Darwin, Thomas Huxley, and Joseph Hooker found a congenial environment which provided a wonderful training for their subsequently distinguished lives. Members of the Royal Navy also collected many new birds, such as Ross' and Sabine's gulls, not to mention McCormick's (South Polar) Skua. Similar activities were taken up by the rest of Europe. It is sad that their American counterpart, the Marine Audubon, Titian Ramsay Peale, received such a raw deal with Wilkes' grim United States Exploring Expedition (Poesch 1961). Since he was their greatest precursor perhaps the Pacific Seabird Group might try to restore his unjustly damaged reputation?

The American contribution to marine ornithology became increasingly impor-

tant with the work of Robert Cushman Murphy following his youthful voyage in the sealer *Daisy* to South Georgia, described in *Logbook for Grace*. In addition to explaining the ornithological implications of the *Discovery* and other new oceanographic investigations in *The Oceanic Birds of South America* (1936), he also supervised the American Museum of Natural History's Whitney South Sea Expedition led by Rollo Beck which visited much of the South Pacific between the wars. Its records provide a fascinating insight into not only a great expedition but human conduct in exceptional circumstances. It seems a pity that, as with the Smithsonian Pacific Program further north in the 1960s, while it resulted in many observations, large collections and numerous valuable papers, possibly owing to political considerations, no general account of its important achievements has ever been published.

Ornithology in the Royal Navy, which originally consisted mainly of observations over the sights of a gun, declined following the cuts after World War I. It was revived during World War II by an influx of young conscripts more interested in the birds while they were still alive, and the Royal Naval Bird-watching Society was founded to maintain this work in 1946. When I became interested in their world-wide reports while collecting West African seabird records in the 1950s I was asked by their long-serving Chairman, Captain Gerald Tuck, to summarize them annually in their report *Sea Swallow*. This compelled the adoption of a broad perspective, whereupon it became clear that although many individuals were now studying seabirds throughout the world, there were still only informal contacts between them, while in most areas the natives were (and are!) abysmally ignorant of marine ornithology. To make further progress we needed much better liaison.

The first problem was to persuade the growing number of frankly often under-employed British and Irish birders to take more interest in their magnificent seabird population. In 1960-61 I circulated a suggestion to the academics interested in seabirds that it was time for more cooperation, and received patronizing replies that they were already all much too busy with their own important work. The proposal therefore languished until it emerged in 1965. Meanwhile the amateurs visiting the growing number of coastal bird observatories in search of the landbird mi-

grants, that appear there with offshore winds, had started watching the seabirds that were the only thing to look at when onshore winds brought them inshore instead. They proved not only keen to see more liaisons, but even ready to help organize it. This led to the explosive development of the first Seabird Group, which immediately set up committees to collate observations from the shore and at sea and organize breeding censuses and surveys of bodies on beaches.

The main British and Irish ornithological societies, which at that time had just completed their post-war reorganization and were still in an unusually enlightened state, supported the Seabird Group on the general grounds that since they could not stop it they might as well join it. It was just reaching the climax of its initial enthusiasm when it became Britain's turn to act as host to the International Ornithological Congress in the summer of 1966. First George and Irene Waterston of the Scottish Ornithologists' Club organized a cruise around Scottish outlying islands that attracted much of the seabird world and developed into a floating seminar. Then when it adjourned to the Congress in Oxford a Seabird Committee was set up over the heads of the management (who had just thrown out my thesis) to maintain international liaison. This has been followed by the foundation of more seabird groups of widely varying character all round the world than I can keep track of.

It may be useful to summarize our experience since we were then in the lead. The group was founded by young amateurs whose main experience lay in sea-watching (meaning looking out to sea from the shore), and it made a point at first of keeping its operations simple and economical for their benefit and in the hope of recruiting a wider membership. It soon became clear, however, that while intensified sea-watching revealed many interesting birds, their movements were so complex both in the short term with the time of day, the tide and the weather, and with longer term seasonal, climatic and oceanic fluctuations, that it would require inordinate effort to make sense of them. Consequently, they are now engaged mainly in search of rare birds (which terrestrial observers everywhere still often remain strangely reluctant to accept). Since I do not remember many other investigations of this type, perhaps this approach might also be found of interest elsewhere?

Secondly, the Royal Society for the Protection of Birds was persuaded to revive its long-established but previously intermittent and disorganized beach surveys for oiled birds. Participants were asked where possible to retain a wing from each body which was simply hung up to dry for subsequent identification of the species and (along with banding recoveries) origin of the birds. This was carried out continuously at first, and was just getting under way when the wreck of the oil-tanker *Torrey Canyon* in the approaches to the English Channel in the spring of 1967 provided a test of its efficacy, demonstrated by the production within four months of the definitive report of the bird mortality in Nature. Later the surveys were carried out on specific dates several times each winter, when most mortality takes place, one coinciding with an international survey during a school holiday in late February throughout northwest Europe, in the hope of obtaining more systematic results, which now show a quite marked decline in chronic oil pollution.

Other often dramatic local bird kills which would otherwise have been overlooked have also been found at intervals of years. These appear to be due to a wide variety of other causes, ranging from infection and poisoning by toxic micro-organisms and chemicals through bad weather to starvation, perhaps sometimes due to overcrowding after a series of good breeding seasons, although it has become fashionable to attribute it to over-fishing. Indeed, the overall mortality due to natural causes still seems to exceed anything achieved by man by at least an order of magnitude. Unfortunately, the bodies only come ashore with onshore winds, and large numbers only occur erratically at long intervals, so it is difficult to sustain regular surveys to form a consistent baseline when there is little to be found for much of the time. Personally I still try to visit our coast to check for bird mortality at intervals, but only extend the survey when bird bodies start to appear.

Another problem demonstrated by the *Torrey Canyon* disaster was the need to treat the oiled birds. Few of some ten thousand that came ashore in front of television cameras were returned to the sea, and out of 71 large auks that were banded before release 22 (27%) were recovered dead within a month. This led to crash programs at Newcastle University to improve the methods used, and by the Royal Society for the Prevention of Cru-

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elty to Animals to put them into practice. In consequence after the recent Sea Empress oil-spill in South Wales over 2,000 out of 3,155 birds (63.5%, mainly Common Scoter) taken into care were cleaned and released. Even the story of the *Torrey Canyon* murres looked better when some laid eggs in captivity and two banded birds were recovered in their presumed area of origin after the bird kill in the Irish Sea two years later. Fifteen out of 824 rehabilitated and banded murres released between 1985-90 (1.8%, near the normal rate) have now been recovered between two and the maximum possible ten years later, and the results of releasing 2,500 banded murres over the last decade are currently being analyzed, with similar results. The *Torrey Canyon* disaster also revealed that knowledge of our seabird numbers and distribution was still inadequate. The Seabird Group was given a grant from the superfluous funds subscribed by the public too late to help the oiled birds to develop past censuses of breeding gannets, fulmars and kittiwakes into a comprehensive survey of all British and Irish breeding seabirds, named by the original chairman of the organizing committee, James Fisher, 'Operation Seafarer.' No sooner was this under way than a further mass mortality of molting auks in the Irish Sea in the autumn of 1969 probably due to bad weather, although the birds were also found to be loaded with toxic chemicals, led to a further grant for studies at sea based at Aberdeen University. This finally overloaded the organization (and especially me!), so that such investigations had to be taken over by other bodies, while the organization has now become a pressure group for raising funds.

Personally I am not entirely happy with this story (Bourne 1989). The first Seabird Group was originally a light-hearted, open-minded, largely young and amateur body designed to promote liaison and social intercourse between a variety of people interested in seabird research and conservation, and run informally on a shoestring, so that it would be accessible to everybody. It was then swept away by the tide of events following the *Torrey Canyon* disaster and bird kill in the Irish Sea, and began to undertake increasingly

large enterprises with inadequate resources and without considering what strings might be attached. This has led to its domination by a new, competitive, pretentious, conformist and often blinkered professional elite mainly interested in raising grants to perpetuate increasingly stale activities, regardless of any continuing need for or appropriateness of such research, or the development of new work and a balanced array of seabird research and conservation as a whole (Bourne 1989).

Thus if we consider the present state of seabird studies, while the recent proliferation of maps of both breeding colonies and distribution at sea and regular monitoring of productivity and mortality seem of absolutely basic importance, it seems unfortunate that less attention has usually been paid to the ways in which seabird numbers and distribution may fluctuate, especially when some of the largest disasters, dwarfing anything achieved by man away from the breeding places, appear to be due to climatic and oceanic fluctuations. Seabirds live exposed to the weather, so surely it deserves much more consideration? There is also a need to pay much more attention to the time factor in their lives, since seabirds commonly have long life-cycles, and may only breed successfully or die in numbers at intervals running into decades. The current practice of trying to complete all research within five years without reading anything more than ten years old is quite inadequate to elucidate their biology.

The nature of the funds available has also led to a distortion of research because it leads to concentration on two subjects, hypothetical threats to seabirds, and problems that they may cause. In the case of threats to the birds, the only serious one in recent times (with the possible exceptions of Steller's Cormorant and the Labrador Duck, where there may have been excessive hunting in the last century?) seems to be predation by man and introduced animals at the breeding places. The problems presented by birds (notably gulls) also often appear to be mainly due to defective hygiene. The vast expenditure of effort investigating pollution seems rather unnecessary, because the remedy is already obvious - do not spill

these substances, as it is with over-fishing - aim for the maximum sustainable yield. In most such cases what is needed is not more research but more action, but few current career structures appear designed to promote such an embarrassing object.

Certain morals can be drawn from this story. If you wish to choose what you do, find some independent means of support. Then if you feel insufficiently employed, agree to organize liaison in a neglected field, preferably one where any established figures are friendly and can be coopted, but do not be put off if they are not, find some way around them.

Then be wary of premature expansion on a trial basis in a new field where support may have strings attached, and there are other more complaisant people ready to run the activity in a more acceptable manner once its feasibility has been demonstrated. If you let them take over (why bother to do anything if someone else is available?), do not walk away, because there may be a need for informed appraisal of their progress, but keep a eye on the situation. Thus seabird studies now seem cluttered up with entrenched and dogmatic bureaucracies endlessly refining stale and increasingly irrelevant issues instead of doing something new, like rivers blocked by ice-floes in the spring. It seems time for a thaw to start the stream of progress flowing again.

References Cited

- Bourne, W.R.P. 1989. Viewpoint - The organization of Seabird Research. *Marine Pollution Bulletin* 20: 158-163.
- Bourne, W.R.P. 1995. Could the Black-toed Petrel *Procellaria melanopus* have been Murphy's Petrel *Pterodroma ultima*? *Notornis* 42: 48-49.
- Poesch, J. 1961. Titian Ramsay Peale and his journals of the Wilkes expedition. *Mem. Am. Phil. Soc.* 52.

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[Remarks given at the Pacific Seabird Group annual meeting January 1997.]

THE ORIGINS OF THE PACIFIC SEABIRD GROUP

Jim King

It is a pleasure, as we age, to be asked to indulge in nostalgia. So here are my memories of the origin of PSG.

My role with seabirds has been mostly as an advocate. In 33 years with the U.S. Fish & Wildlife Service in Alaska seabirds were never mentioned in my job description.

When I moved to the shores of Bering Sea in 1962 as refuge manager on the Yukon Delta, I was amazed at the huge bird colonies at Cape Newenham. My fly-by estimate of more than a million birds was confirmed by later studies. I could find no description of this bird wealth in either the scientific or the popular literature. How could we deny future generations a true picture for how it was, before some man caused tragedy changed it? I found myself thrust into what seemed an ornithological vacuum.

About that time I was able to join a wonderful sea otter counting trip with Karl Kenyon, also with the U.S. Fish & Wildlife Service. In three weeks we flew around every one of the Aleutian Islands. In the evenings we talked about the devastation of the island birds caused by introduced foxes and rats. We flew over various remains from World War II, some still leaking oil. We could see elements of the vast North Pacific fishing fleet that often housed more people on Alaskan waters than were housed on the Alaskan mainland. We saw a full size freight ship recently crushed in the rocks where nothing could be salvaged.

With these things in mind I wrote a crude description of the Cape Newenham birds suggesting that they should be protected in a National Wildlife Refuge. Much to my surprise it was so dedicated by Interior Secretary Stewart Udall in 1968. In 1980 the Cape Newenham National Wildlife Refuge was folded into the Togiak National Wildlife Refuge.

As I dabbled in the seabird realm I soon found myself in correspondence with one Bill Bourne, in Scotland, who seemed to be light years ahead of anyone in America on seabird conservation matters.

A few years later when I was invited to give a paper at the first international swan conference in England I saw a chance to visit Dr. Bourne and get some ideas about what we might do in North America for seabirds.

Just before Christmas 1971, my wife and I spent five wonderful days as guests of the Bourne family in our first visit to Scotland. Bill toured us to the Highlands as well as the coastlines and escorted us to some wonderful Christmas parties. We did manage to talk about the Seabird Group that Bill had helped found.

That spring I recounted these adventures to Jim Bartonek, Alaskan FWS research biologist. We discussed the need for a Pacific Seabird Group and decided to found it right there in Fairbanks. And so it was that 100 percent of the initial PSG membership was composed of waterfowl biologists - the two of us.

Jim and I agreed that for PSG seabirds would mean any bird dependent on any marine environment. A major objective would be to extend the same sort of production and population monitoring used for waterfowl to the other species.

That fall (1972) Jim introduced the PSG concept at a meeting of the Western Society of Naturalists in Arcata, California. Finding substantial interest he put his assistant, a young fellow named George Divoky, to work building a mailing list, doing a bulletin and setting up an initial annual meeting.

That first PSG meeting in December 1974, much to the amazement of our more earthy members, occurred at the Providence Heights Education and Conference Center, Issaquah, Washington, which was a nunnery in rural Washington that was

designed for religious gatherings. It turned out to be a too quiet place for a meeting with the exception of one evening when the dinner wine lasted on and on into the wee hours of the next day.

Stories from that session survive. I remember Pete Isleib, fearless boatman of the North Pacific, showing up in the middle of the night in a state of moderate shock. He had decided to get a little fresh air thereby discovering that nunneries lock all their doors at night. Suffering the early stages of hypothermia, he determined there was no possibility for building a survival fire in the immaculate gardens surround him. He finally found a window he could climb through. He wouldn't say whether he had aroused any of the sleeping church ladies.

It has all been up and up for PSG since then.

Here at this meeting a quick demographic review suggests the age ratio of PSG members is very favorable to the increasing prosperity of the organization on into the 21st century.

I know some young people listening to stories of the past think they have missed the best of times. I did some of that thinking myself. As I see it now we have a sound base, increasing popular support and wonderful new technologies. The prospects ahead for exciting and rewarding careers in seabird ornithology have never been brighter. Who can guess at the amazing things that will be disclosed at future PSG meetings by people that are here now.

Good luck and thanks.

By *James G. King*, 1700 Branta Road, Juneau, Alaska 99801 USA.

[Remarks given at the Pacific Seabird Group annual meeting banquet, January 1997, after receiving PSG's Lifetime Achievement Award.]

REVIEW ARTICLES

SEABIRDS IN RELATION TO ECOSYSTEM MANAGEMENT OF FISHERIES

Testimony to the Ecosystem Advisory Panel, 10 September 1997

Vivian M. Mendenhall and Craig S. Harrison

The Pacific Seabird Group is an international professional society of ecologists and other specialists in seabird ecology. Many of our members do research on the relationships between seabirds, fish populations, and fisheries. The information we are presenting here was compiled with the help of colleagues in North America and other parts of the world. The authors are seabird biologists with many years of experience in Alaska and Hawaii.

The application of ecosystem principles to the management of commercial fisheries will require that managers consider all biotic components of the ecosystem in their decisions. We recognize that ecosystems are very complex and that managers cannot include everything in their models. New species must be selected for consideration in fisheries management either because (a) they have an influence on fish stocks, or (b) they are vulnerable to being influenced by changes in fish stocks. Seabirds are a major part of the marine environment, and they can interact with fisheries in both directions.

In this presentation we would like to summarize the relevance of seabirds to ecosystem management of fisheries, the principal ways in which birds interact with fisheries (and vice versa), current research on bird-fishery relationships (including multispecies modelling), and research that is needed in order to include birds ecosystem management of fisheries.

Relevance Of Seabirds To Fisheries

Seabirds should be included in ecosystem management of fisheries both in order to manage effects of fisheries on seabirds, and because seabird studies can contribute useful data to fisheries management. We will return to some of these points again below.

- Seabirds are a conspicuous and highly-valued part of the marine ecosystem. The public enjoys seabirds, as attested by the vigorous tourist industry for viewing birds. Seabirds also form a small but important part of the legal subsistence harvest by Alaska Natives (Wohl et al.

1995).

- Congress has made seabirds a trust responsibility of the U.S. Fish and Wildlife Service, which is required to maintain healthy seabird populations. To this end, Fish and Wildlife coordinates closely with the National Marine Fisheries Service and several Fisheries Management Councils in both research and management.

- Seabirds are strongly dependent on small fish for food, and therefore the birds are vulnerable to changes in fish stocks caused by fisheries or other factors. Major declines in seabird populations have been associated with fisheries in some cases. Management of seabirds will improve when fisheries management is based on ecosystem considerations (discussed further below).

- Birds can consume significant fractions of the annual fish production in some areas. Fishery management may benefit from including this mortality factor in models (discussed further below).

- Studies of bird/forage fish relationships are producing data on distributions and dynamics of forage fish stocks. Several multispecies models are being developed to explore relationships between birds, fish, and primary production. These data can contribute to the multispecies management of fisheries (discussed further below).

- Birds can serve as indicators of fish stocks and their environment. Birds "sample" small forage fish more easily than do research trawls; monitoring diets of some seabird species can contribute to the assessment of juvenile fish stocks (Hatch and Sanger 1992). Monitoring of trends in seabird productivity and populations is easier than it is for other top predators. Environmental conditions throughout the marine ecosystem are reflected in seabird trends, which can suggest the need for studies of other components (Montevecchi 1993).

- Birds recycle large amounts of nutrients from offshore feeding areas into nearshore waters by means of their excretion at breeding colonies. This enrich-

ment may influence nearshore productivity.

Seabird Fisheries Interactions

Many seabird species depend on small fish for food (Ainley and Boekelheide 1990, Harrison 1990, Vermeer et al. 1993). This dependence is especially strong when birds are feeding their young, since fish are the most nutritious and easiest to carry to nestlings of all potential prey species. A relatively small number of fish species provide essential seabird forage on the Pacific coast and Hawaii, including capelin, sand lance, juvenile walleye pollock, Pacific saury, anchovy, rockfishes, lanternfish, and mackerel scad. In many areas only one or two forage fish species are suitable for breeding seabirds (Anderson and Gress 1984, Ainley and Boekelheide 1990, Springer 1991). Birds compete for forage fish with each other and with other groups of predators. A few fish species are the targets of large commercial fisheries, and most are important forage species of marine mammals and other fish.

Seabird populations are primarily limited by forage fish availability (Birkhead and Furness 1985). If the primary fish prey of seabirds is scarce, breeding success is poor. In extreme cases, adult birds may starve. Forage fish stocks and the availability of fish to the birds fluctuate naturally with oceanographic conditions. Birds are adapted to recover from occasional poor years, but long-term scarcity of the birds' preferred forage fish leads to declines in their populations (Ainley and Boekelheide 1990, Francis et al. 1996, Duffy 1997). In cases where population declines had other causes (such as hunting or oil pollution), the ability of bird populations to recover is sometimes limited by food supply (Furness 1982, Ainley and Boekelheide 1990, Duffy 1997).

Changes in seabird food resources have been studied in many parts of the world. The roles of climate and fisheries in these changes are hard to differentiate (Duffy and Schneider 1994). Climatic fluctuations undoubtedly contribute to fluctuations in seabird food resources

(Wooster 1993), but fisheries also may do so (Duffy 1983, Steele 1991, Mendenhall and Anker-Nilssen 1996). It has been suggested that the Alaskan pollock fishery may have reduced forage stocks of birds in local areas near their breeding colonies, or over larger areas through indirect ecosystem effects (Francis et al. 1996, Piatt and Anderson 1996).

The North Pacific Fisheries Management Council is considering a measure that would prohibit fisheries on most forage fish species in Alaska (existing fisheries on pollock and herring would continue). This would benefit predatory fish, marine mammals, and seabirds.

Consumption Of Fish Stocks By Seabirds

Estimation of the food consumed by seabirds is a complex matter. Data are a combination of elusive field measurements (such as diets of birds scattered over the open sea during winter), laboratory studies, and modelling. Estimates are therefore few and approximate. However, a tentative conclusion is that seabird impacts on fish stocks can be high in local areas but may be insignificant for stocks as a whole. Seabird populations are highly concentrated in summer, when birds are packed into dense nesting colonies on isolated cliffs and islands. Breeding seabirds have a limited foraging range of 5 to 100 miles (depending on species). At such times seabirds may consume 10% to 80% of annual fish production within foraging range of the colonies (Furness 1978, Springer et al. 1986). The majority of the stock beyond foraging range of the colony often receives little predation pressure during summer. During the rest of the year, seabird populations are concentrated elsewhere or are spread thinly over the sea. Overall pressure on large fish stocks from bird predation may be 5% to 12% (Springer et al. 1986, Furness and Tasker 1997). During the breeding season, fishing close to seabird colonies potentially can affect local prey of the birds, and birds conceivably could affect the fishery in turn. For the stock as a whole, fisheries are more likely to reduce stocks for birds than the other way around.

Seabirds That Depend On Fish To Drive Prey Within Reach

Many tropical seabirds forage on fish schools that are driven to the surface by large predatory fish, in particular the skipjack tuna (Harrison 1990). Several

Hawaiian seabird species can obtain their prey only in association with tuna; such bird species would be unable to survive in the absence of their fish commensals. Tuna are fished commercially, and management does not include consideration of seabird requirements.

Consumption Of Fishery Discards By Birds

Some species of seabirds are attracted to fishing vessels (as is well known by fishermen) because they feed on offal from on-board processing or other discards. In some parts of the world this garbage has been responsible for population increases in seabirds (Furness 1982, Camphuysen et al. 1995). Artificial food is a mixed blessing for birds; some species can be forced out of their habitats or killed as a result of the increase in other species. No information is available on how American fishery discards affect bird populations.

Incidental Take Of Seabirds In Fishing Gear

Although "bycatch" of seabirds in fishing gear is not an ecosystem issue in the usual sense, we will mention it because it is of concern to fishers, seabird managers, and the public. Some fishing gear catches large numbers of seabirds, particularly gillnets and longlines. At present longline fisheries are the principal problem in the Pacific Exclusive Economic Zone (EEZ). They are estimated to catch approximately 9,000 seabirds annually in Alaska and 4,000 in Hawaii. Two albatrosses are of the greatest concern: the Short-tailed Albatross, which is highly endangered (its world population is just 800 individuals), and the Black-footed Albatross, whose population is 60,000 but which is declining. Some measures to reduce seabird bycatch are now required in the Alaskan longline fishery, but no action has been taken in Hawaii.

Current Research On Seabird-Fish Relationships

Several current research projects throughout the world are exploring the relationships of seabirds to marine ecosystems, and to fish stocks in particular. Pat Livingston is providing a list of Alaskan projects in her presentation. We will summarize fishery-related results from a few of these. We will also describe advances in a couple of other parts of the world.

The Alaska Predator Ecosystem Experiment (APEX)

This is a large five-year study that began in 1995. Its goal is to describe how the marine ecosystem of Prince William Sound and the northern Gulf of Alaska limits seabird populations. It is administered by the University of Alaska Anchorage and is funded by the Exxon Valdez Oil Spill Trustees Council. The overall goal is to determine whether some species of birds are failing to recover from the oil spill because of lingering pollution or environmental limitations (Duffy 1997). APEX includes 15 separate projects, and it is part of a larger project which includes fish and marine mammals.

The dynamics of forage fish in the study area under various marine conditions are becoming better known as a result of this project. For instance, a large-scale shift in the Gulf of Alaska marine system which began in the mid 1970's led to an increase in pollock and a decrease in capelin, both in the Gulf of Alaska and Prince William Sound (Piatt and Anderson 1996, Duffy 1997). In contrast, sand lance stocks increased during this period in some coastal areas. The responses of various seabird species to forage fish densities and distributions are being better quantified. For instance, some bird species need higher densities of prey than others, and large birds may be better than small species at raising their young in spite of scarce food resources. The APEX project is quantifying new details of bird-fish interactions.

Two multi-species models will use data from APEX studies.

- One model will evaluate whether changes in bird populations are being driven by changes in fish stocks or distribution. It will also estimate the impacts of seabirds on forage fish stocks. Inputs from fish data will include fish species, school size, nutritive value, and distance of schools from bird colonies. Inputs from bird data will include responses of each bird species to foraging conditions, such as frequency of feeding, length of foraging trips, and reproductive success. This model may advance analysis of bird-fish relationships considerably.

- A food web model will incorporate data from the APEX, fish, and marine mammal projects. It will simulate interactions throughout the food web, from phytoplankton to top predators. This model will use an existing framework, ECOPATH. Inputs for each species will include biomass, production, fisheries

catch rate (where relevant), and mortality caused by each predator on the species. The goal will be to analyze how changes in any variable are likely to be reflected in shifts throughout the ecosystem, and how long the system takes to recover.

Seabird, Marine Mammal, And Oceanography Coordinated Investigations (SMMOCI)

This project is investigating how seabird populations at Alaskan breeding colonies are limited by forage fish dynamics (Byrd et al. 1997). The project is a cooperative effort of NMFS, the U.S. Fish and Wildlife Service, the Biological Resource Division of USGS, and the University of Alaska Fairbanks. Fish locations and densities near six colonies throughout Alaska will be correlated with bird feeding distributions and breeding populations. Fish ecology and marine mammals also are being studied at the same sites. Unlike most research, this project is planned for repeat observations at each colony for a number of years. It will be possible to compare interactions of forage fish and bird populations for areas with various oceanographic characteristics. At the colony studied in 1996 in the eastern Aleutian Islands, the major forage species were 0-class juvenile pollock and zooplankton.

Ecosystem Relationships Of Foraging Seabirds In The Bering Sea

This project is a continuation of over 20 years of studies of seabird feeding ecology throughout the Bering Sea shelf (Decker et al. 1995). Cooperators include the University of California at Irvine, NMFS (as part of the FOCI investigation), and PISCES/GLOBEC. Birds in this area feed on fish (juvenile pollock, lanternfish at the shelf edge, zooplankton) where these prey are concentrated by local currents, water masses, and sea-floor topography. Part of the project in 1997 examined marine productivity and bird foraging near the Alaska Peninsula, and found that unusually warm and stratified water had reduced food for both seabirds and commercial fish species (sockeye salmon).

Multispecies Modelling Of Seabird-Fishery Relationships In The North Sea

The North Sea between Britain and Norway has a large commercial harvest of sandeel (*Ammodytes marinus*, a close relative of the sand lance). British seabirds depend on the sandeel in some areas

and therefore are vulnerable to impacts from the fishery (Furness 1982). A model has been developed to examine relationships between the sandeel fishery on seabirds (Furness and Tasker 1997). Inputs include bird populations at sea and in colonies and diets and energy requirements of the birds. The majority of bird consumption occurred inshore, where seabird colonies are located, whereas most fishery harvest was in offshore areas.

The authors also evaluated the existing multi-species virtual population analysis (MSVPA) for sandeels. They concluded that the MSVPA for sandeels underestimates predation by seabirds in areas near seabird colonies.

Another model evaluated the effect on seabird populations of offal discarded by trawlers. Population sizes and species ratios of seabirds are influenced by this food source in the North Sea (Camphuysen et al. 1995).

Bird-Fishery Interactions On The Coast Of Norway

Seabirds breeding on the Norwegian coast depend on capelin, sandeel, and juvenile herring, all of which are fished commercially. Populations of some species have declined severely during the past two decades because of fish population changes. Bird trends have been correlated with both climatic changes and fishery harvests (Mendenhall and Anker-Nilssen 1996). Birds may be useful for monitoring Norwegian fishery stocks.

Bird-Fishery Interactions On The Coast Of Eastern Canada

Seabirds breeding on the coast of Newfoundland rely primarily on capelin, which are fished commercially. Species of birds respond in various ways to forage limitations. Climatic changes have caused scarcity of forage fish near the coast; however, the principal impacts of fisheries may be on other stocks (Mendenhall and Anker-Nilssen 1996).

Research Needed

Many aspects of relationships between seabirds and fisheries still require research. We will summarize a few that are relevant to fisheries management.

Estimating ecosystem relationships of seabirds and fisheries requires reliable data on the distribution and diets of seabirds during each season of the year. Data for large parts of the eastern Pacific and Alaskan waters are reliable only for the

breeding season. Much more pelagic bird research is needed between September and May.

- The relationships of seabird population trends to the dynamics of forage fish near seabird colonies are being studied in detail for the first time. Information is lacking, however, on how local fish dynamics are determined by the dynamics of entire stocks. This information is needed before impacts of fishery management on seabirds can be predicted.

- Multispecies and ecosystem models are needed that allow prediction of the impacts of seabirds and fisheries on each other.

- Predictions of all ecosystem trends, including those in fisheries and seabirds, are subject to uncertainty. This will be true even when models have become more sophisticated. Managers should be prepared to view model results as guidelines, not the gospel truth. Management decisions should be conservative whenever trends in a fishery's ecosystem seem to be at odds with the predictions of a model, whether or not the components in question are included in the model (Parsons 1993).

Conclusions

Seabirds are a major component of marine ecosystems. Ecosystem management of fisheries should take birds into account. Much more information is being made available now than in the past. These advances have been possible because of temporary increases in funding (in particular for the *Exxon Valdez* restoration studies) and because of new cooperative studies by fishery biologists and bird biologists. Ecosystem modelling and multispecies fishery management will benefit from these advances. We look forward to working with fishery managers on developing the management of marine ecosystems.

References Cited

(Note: This presentation is supported by selected references. Additional literature citations for some topics are available on request.)

Ainley, D.G. and R.J. Boekelheide, eds. 1990. Seabirds of the Farallon Islands: ecology, dynamics, and structure of an upwelling-system community. Stanford University Press, Stanford, CA.

Anderson, D.W., and F. Gress. 1984. Brown pelicans and the anchovy fishery off southern California. Pp. 128-135

REVIEW ARTICLES

- in D.N. Nettleship, G.A. Sanger, and P.F. Springer (eds.). Marine birds: their feeding ecology and commercial fisheries relationships. Canadian Wildlife Service Publication Number. CW66-65/1984. (Available from the Pacific Seabird Group, c/o Jan Hodder, Oregon Institute of Marine Biology, University of Oregon, Charleston, Oregon, USA)
- Birkhead, T.R., and R.W. Furness. 1985. Regulation of seabird populations. British Ecological Society Symposium 21:145-167.
- Byrd, G.V., R.L. Merrick, J.F. Piatt, and B.L. Norcross. 1997. Seabird, marine mammals, and oceanography coordinated investigations (SMMOCI) near Unimak Pass, Alaska. In Role of Forage Fishes in Marine Ecosystems. Proc. 17th Lowell Wakefield Fisheries Symposium, 13-16 November 1996, Anchorage, Alaska. In press.
- Camphuysen, C.J., B. Calvo, J. Durinck, K. Ensor, A. Follestad, R.W. Furness, S. Garthe, G. Leaper, H. Skov, M.L. Tasker, and C.J.N. Winter. 1995. Consumption of discards by seabirds in the North Sea. Final report, EC DG XIV Research Contract BIOECO/93/10. NIOZ Rapport 1995-5 edition. Netherlands Institute for Sea Research, Texel, Netherlands.
- Decker, M.B., G.L. Hunt, Jr., and G.V. Byrd, Jr. 1995. The relationships among sea surface temperature, the abundance of juvenile walleye pollock (*Theragra chalcogramma*), and the reproductive performance and diets of seabirds at the Pribilof Islands, southeastern Bering Sea. Pp. 425-437 in R.J. Beamish, (ed.). Climate change and northern fish populations. Canada Special Publication in Fisheries and Aquatic Science 121.
- Duffy, D.C. 1983. Environmental uncertainty and commercial fishing: Effects on Peruvian guano birds. Biological Conservation 26:227-238.
- Duffy, D.C., and D.C. Schneider. 1994. Seabird-fishery interactions: a manager's guide. Pp. 26-38 in D.N. Nettleship, J. Burger, and M. Gochfeld (eds.). Seabirds on islands: threats, case studies and action plans. BirdLife Conservation, Ser. 1. BirdLife International, London.
- Duffy, D.C. 1997. APEX Project: Alaska Predator Ecosystem Experiment in Prince William Sound and the Gulf of Alaska. Exxon Valdez Oil Spill Restoration Project, Annual Report (Restoration Project 96163 A-Q). Alaska Natural Heritage Program and Department of Biology, University of Alaska Anchorage, Anchorage, AK.
- Francis, R.C., O.G. Anderson, W.D. Bowen, S.K. Davis, J.M. Grebmeier, L.F. Lowry, I. Merculieff, N.S. Mirovitskaya, C.H. Peterson, C. Pungowiyi, T.C. Royer, A.M. Springer, and W.S. Wooster. 1996. The Bering Sea ecosystem: report of the Committee on the Bering Sea Ecosystem, National Research Council. National Academy Press, Washington, D.C.
- Furness, R.W. 1978. Energy requirements of seabird communities: a bioenergetics model. Journal of Animal Ecology 47:39-53.
- Furness, R.W. 1982. Competition between fisheries and seabird communities. Advances in Marine Biology 30:225-307.
- Furness, R.W. and M.L. Tasker. 1997. Seabird consumption in sand lance MSVPA models for the North Sea, and the impact of industrial fishing on seabird population dynamics. In B. Baxter (ed.). Proceedings: Forage fishes in marine ecosystems. Alaska Sea Grant College Program, publication AK-SG-97-01. In press.
- Harrison, C.S. 1990. Seabirds of Hawaii: natural history and conservation. Cornell University Press, Ithaca, NY.
- Hatch, S.A., and G.A. Sanger. 1992. Puffins as samplers of juvenile pollock and other forage fish in the Gulf of Alaska. Marine Ecology Progress Series 80:1-14.
- Mendenhall, V.M., and T. Anker-Nilssen. 1996. Seabird populations and commercial fisheries in the circumpolar region: Do we need to worry? Circumpolar Seabird Bulletin no. 2:1-7. (Available from Nongame Migratory Bird Project, U.S. Fish and Wildlife Service, 1011 E. Tudor Rd., Anchorage, AK 99503.)
- Montevecchi, W.A. 1993. Birds as indicators of change in marine prey stocks. Pp. 217-266 in R.W. Furness and J.J.D. Greenwood (eds.). Birds as monitors of environmental change. Chapman & Hall, London.
- Parsons, L.S. 1993. Management of marine fisheries in Canada. National Research Council of Canada, Ottawa, Ontario.
- Piatt, J.F., and P. Anderson. 1996. Response of Common Murres to the Exxon Valdez oil spill and long-term changes in the Gulf of Alaska marine ecosystem. American Fisheries Society Symposium 18:759-769.
- Springer, A.M. 1991. Seabird distribution as related to food webs and the environment: examples from the North Pacific Ocean. Pp. 39-48 in W.A. Montevecchi and A.J. Gaston (eds.). Studies of high-latitude seabirds. 1. Behavioural, energetic, and oceanographic aspects of seabird feeding ecology. Canadian Wildlife Service, Occasional Paper 68.
- Springer, A.L., D.G. Roseneau, D.S. Lloyd, C.P. McRoy, and E.C. Murphy. 1986. Seabird responses to fluctuating prey availability in the eastern Bering Sea. Marine Ecology Progress Series 32:1-12.
- Steele, J.H. 1991. Marine functional diversity. BioScience 41:470-474.
- Vermeer, K., K.T. Briggs, K.H. Morgan, and D. Siegel-Causey (eds.). 1993. The status, ecology, and conservation of marine birds of the North Pacific. Canadian Wildlife Service, Ottawa. Special Publication.
- Wohl, K.D., T.L. Nelson, and C. Wentworth. 1995. Subsistence harvest of seabirds in Alaska. Unpublished report; available from U.S. Fish and Wildlife Service, Nongame Migratory Bird Project, 1011 East Tudor Rd., Anchorage, AK 99503.
- Wooster, W.S. 1993. Is it food? An overview. Pp. 1-3 in Is it food?: Addressing marine mammal and seabird declines; workshop summary. University of Alaska Fairbanks, Fairbanks, AK. Alaska Sea Grant Report 93-01.

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ARTICLES

SEARCHING FOR THE LONG-BILLED MURRELET ON HOKKAIDO ISLAND, JAPAN

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The Long-billed Murrelet (*Brachyramphus perdix*), a small alcid of the northwestern Pacific, and its former conspecific, the Marbled Murrelet (*Brachyramphus marmoratus*; American Ornithologists' Union 1997), have long been recognized as "enigma(s) of the Pacific" (Guiguet 1956) because details about their breeding biology remained a mystery for more than a century. While extensive research has been conducted on the biology of *B. marmoratus* during the last 10 years (see Ralph et al. 1995, Nelson 1997), only limited opportunistic information is available on the distribution, abundance and habitat associations of *B. perdix*. Because of a variety of potential threats to the Long-billed Murrelet in Japan, including habitat loss and oil spills (e.g., Helm et al. 1997), determining its breeding status and habitat use will be important for future management and conservation of this species. Herein we describe our recent efforts to learn more about the inland habitat use of this elusive species in northern Japan.

At present, the general breeding distribution of the Long-billed Murrelet is described as extending from the Kamchatka Peninsula and Komandorski Islands (Russia) in the north, southward through the Kuril Islands, along the north and west coasts of the Sea of Okhotsk (Magadan to Sakhalin Island, Russia), south to Hokkaido Island, Japan, and south and east along the coast of the Primorye Region (Primorski Krai) and the Sea of Japan to Vladivostok, Russia (Konyukhov and Kitaysky 1995, Nel-

son 1997). Available information suggests that its breeding range is primarily determined by the distribution of taiga forest in coastal areas of the region (Kistchinski 1968). In Russia, five nests are known in coniferous and mixed forest within 30 km of the coast. One ground nest was found on an open scree slope in mixed coniferous/broad-leaved forest at 700 m in elevation and 30 km inland in the mountains above Shelikhova Bay, near Magadan (A. Kistchinski unpublished data). Four tree nests were found in *Larix gmelini* (Dahurian larch) trees in taiga forests up to 12 km inland near the cities of Magadan and Okhotsk, on Sakhalin Island, and at Olga Bay on the Primorye coast, 274 km north of Vladivostok

Amur River (flows into Tatarski Strait near Sakhalin Island).

There are only a few observations that suggest breeding by Long-billed Murrelets in Japan. A ground nest with three eggs was reported from Mt. Mokoto (Mokoto-yama) in 1961, 24 km inland on Hokkaido Island (Brazil 1991, Konyukhov and Kitaysky 1995), but it was later discovered that the eggs had been misidentified. Interestingly, an adult murrelet, supposedly attending this nest, was shot and collected in 1961 and later confirmed to be a Long-billed Murrelet. Recent (1980's and 1990's) sightings of hatch-year birds in the Sea of Okhotsk just north of Mt. Mokoto (Brazil 1991) and along the northwest coast of the

Shiretoko Peninsula (M. Matsuda, Y. Fukuda pers. comm.) have also been reported.

After discussions between Japanese and American Pacific Seabird Group biologists in 1993 (see Carter and de Forest 1993), it was decided that a concerted effort should be undertaken to determine the breeding states of the Long-billed Murrelet in northern Japan. The effort began on 19 and 20 July 1993, when inland surveys were initiated in north-eastern Hokkaido in an attempt to locate potential breeding sites (J. Minton, H.

Nakagama, and M. Matsuda, unpublished data). Four survey stations were established: (1) two on Mt. Mokoto, one in a valley of large *Picea jezoensis* (Yezo spruce) trees (Site 1) and one at the site where an adult was collected in 1961 (Site 2); and (2), two in Shiretoko National

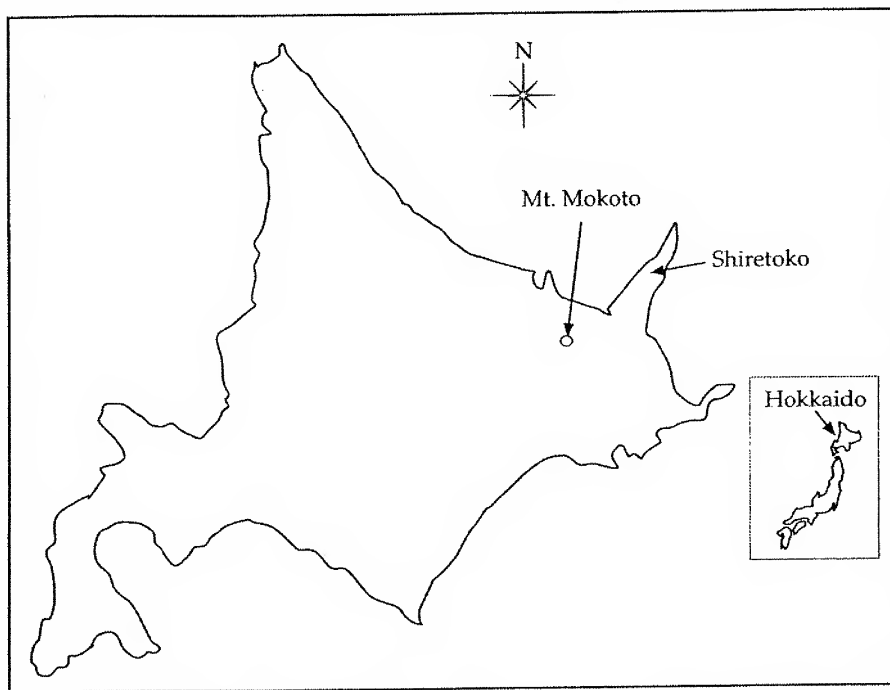


Figure 1. Map of Hokkaido Island, Japan, showing the location of Mt. Mokoto and the Shiretoko Peninsula.

(Kuziyakin 1963, Nechaev 1986, Labzyuk 1987, Kondratyev and Nechaev 1989). In addition to these nests, two females were collected with eggs in their oviducts in the Sea of Okhotsk and off the Kamchatka Peninsula, and sightings of murrelets have occurred as far as 60 km inland along the

Park, one on the pass road in mixed *Abies sachalinensis* (Saghalin fir) and *Betula ermanii* (birch) forest (Site 3) and one along the Iwaobetsu River (Iwaobetsu-kawa; Site 4) (Figures 1 - 4). Surveys from shore, to detect birds on nearshore waters, were also conducted at 11 stations on 19 July. Despite these efforts, no murrelets were detected during these surveys, although fog many have prevented observations on the water.

At the PSG meeting in Victoria, British Columbia in 1995, discussions between Japanese and American biologists (ourselves and H. Carter) resulted in the decision to follow up on the 1993 surveys and continue efforts to determine the breeding status of the Long-billed Murrelet in Japan. Therefore, we initiated the surveys described herein to locate potential breeding sites of this species in northeastern Hokkaido. Specific objectives of these surveys were to: (1) locate potential inland breeding sites on the Shiretoko Peninsula and Mt. Mokoto; (2) identify areas of suitable nesting habitat; and (3) train surveyors for future inland surveys.

Study Area

We focused all but one of our surveys on the Shiretoko Peninsula and in Shiretoko National Park on the northeast coast of Hokkaido Island (Figures 1 and 3 - 6). This peninsula, especially Shiretoko National Park, includes the largest undisturbed forest in close proximity to existing records of murrelets (adults and young of the year) in the Sea of Okhotsk and at Mt. Mokoto (Brazil 1991, M. Matsuda pers. comm.). Shiretoko is a long, narrow peninsula (70 km long and 25 km wide) that juts into the Sea of Okhotsk. The National Park extends from the middle of the peninsula to the cape. The interior of the peninsula is lined with volcanic mountains that range to

sachalinensis (Saghalin fir), and *Picea jezoensis* (Yezo spruce). Above 600 m the vegetation is dominated by *Betula ermanii* (birch) and *Pinus pumila* (pine; Ohtaishi and Nakagawa 1988). In summer, the climate on the Utoro side (northwest) of the peninsula is mild and relatively dry (average precipitation 91.7 mm, temperature 15° C), while the Rausu side (southeast) is often foggy, cool and damp (average precipitation 145 mm, tempera-

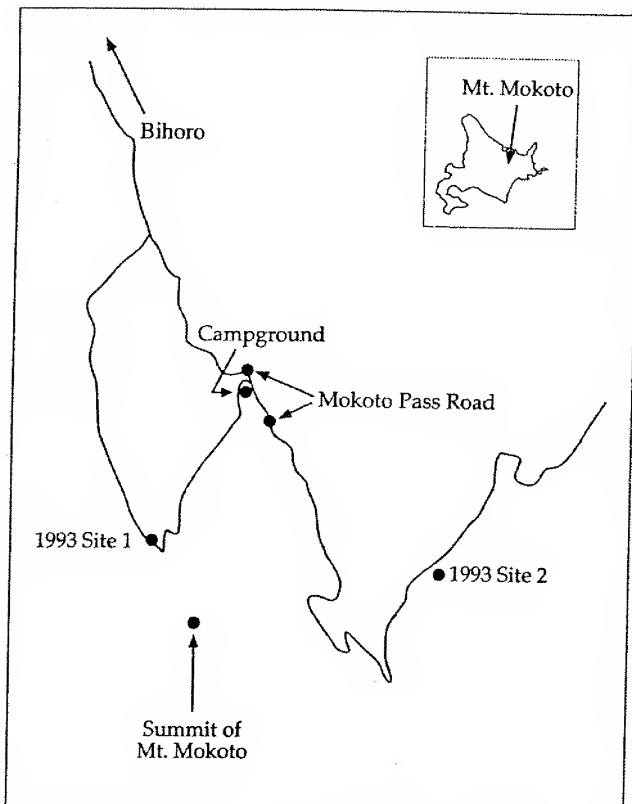


Figure 2. Map of Mt. Mokoto, northeastern Hokkaido, Japan, showing the locations of the 1993 and 1996 Long-billed Murrelet survey stations.

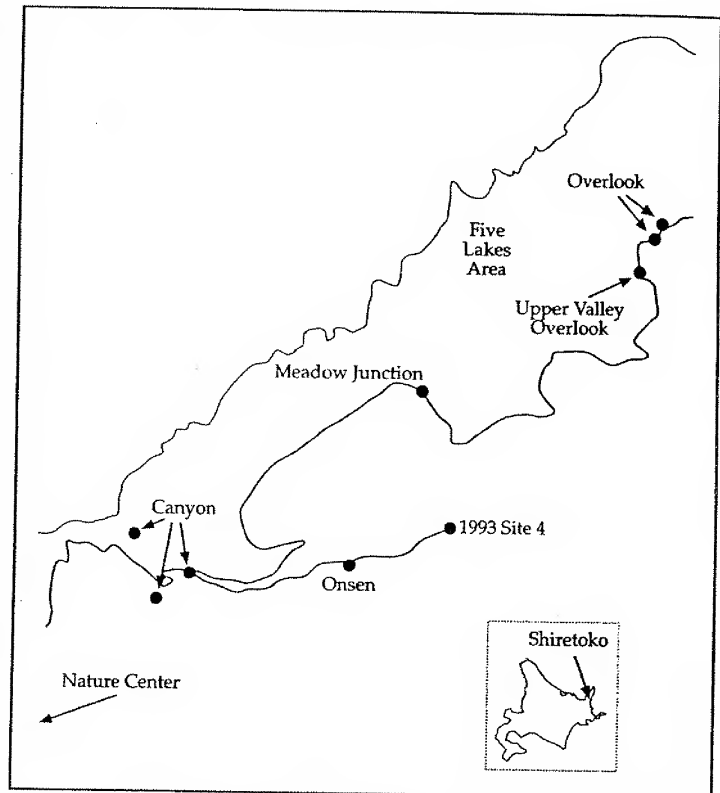


Figure 3. Map of the 1993 and 1996 Long-billed Murrelet survey stations located along the northwest side of Shiretoko National Park, Hokkaido, Japan.

1661 m in elevation. Parts of the coastal areas on both sides of the peninsula (but especially on the west side) are lined with steep volcanic cliffs. The vegetation up to 600 m is primarily mixed deciduous and coniferous forest including *Quercus mongolica* (Mongolian oak), *Acer mono* (painted maple), *Ulmus davidiana* (Japanese Elm), *Taxus cuspidata* (Japanese yew), *Abies sachalinensis*

(Saghalin fir), and *Picea jezoensis* (Yezo spruce). Above 600 m the vegetation is dominated by *Betula ermanii* (birch) and *Pinus pumila* (pine; Ohtaishi and Nakagawa 1988). During the winter months, precipitation falls primarily in the form of snow, and ice floes in the Sea of Okhotsk and Nemuro Strait surround the peninsula.

One survey was conducted at Mt. Mokoto (elevation 999 m), an old volcano adjacent to Kussharo Lake (Kussharo-ko), located 24 km inland in northeastern Hokkaido (Figures 1 and 2). Weather and vegetation on Mt. Mokoto are similar to

the Shiretoko Peninsula. At our survey stations (>700 m), the forest consisted primarily of *Abies sachalinensis* (Saghalin fir) and *Betula ermanii* (birch).

Surveys were never conducted on the Rausu side, however, because of highway construction, time constraints, and marginal habitat (limited trees with plat-

July on Mt. Mokoto and 3 - 6 July on the Shiretoko Peninsula) (Tables 1 and 2, Appendix). Surveys followed the Pacific Seabird Group (PSG) survey protocol (Ralph et al. 1994) with a few modifications. Surveys began 120 minutes (instead of 45 minutes) before, and continued until 90 minutes after, official sunrise. Our survey crew consisted of 14 biologists familiar with the biology and vocalizations of murrelets. These biologists were stationed in groups of 2 - 5 to maximize the chances of detecting birds flying silently up drainages or over ridges.

Results

A total of 60 observer days of surveys (9 at Mt. Mokoto and 50 on the Shiretoko Peninsula) were conducted between 1 and 6 July (Tables 1 and 2, Appendix). No Long-billed Murrelets were detected during these surveys, although there were several potential vocalizations heard along the Coast Road on 4 and 5 July. An additional survey was conducted at this site on 6 July, but no detections were recorded.

Discussion

Sixty observer days of surveys were not enough to locate Long-billed Murrelets in, or conclude they are absent from, northeastern Hokkaido. According to the Pacific Seabird Group survey protocol (Ralph et al. 1994), at least four surveys at each survey site should be conducted per year for two consecutive years to determine presence and absence. Therefore, additional effort will be required to determine the status of Long-billed Murrelets on Mt. Mokoto and the Shiretoko Peninsula.

Hokkaido is located in the southern portion of the breeding range of *B. perdx* and much of the native forest on the island has been logged or modified, therefore this species probably occurs in low numbers on the island. Despite a potentially small population size, we believe the limited observations of juveniles on the water and the discovery of an adult at an inland location, combined with the presence of suitable nesting habitat in forested and alpine areas, indicate that Long-billed Murrelets have a high likelihood of nesting in northeastern Hokkaido. Additional inland observations of this species during the breeding season just north of Hokkaido, on Sakhalin Island (known nest site) and on the southern Kuril Islands (Shikotan, Iturup, Urup and Kunashir; Nechaev 1986, Konyukhov and

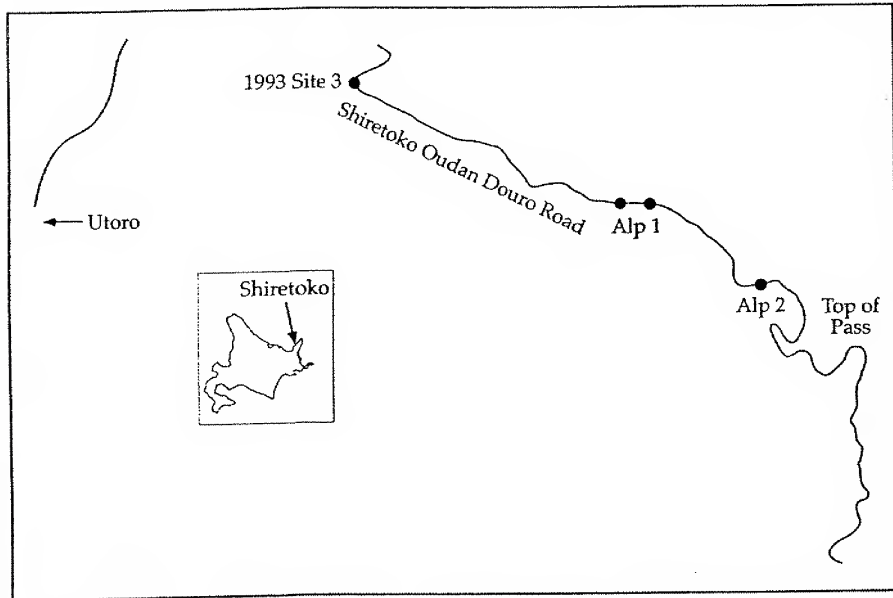


Figure 4. Map of the 1993 and 1996 Long-billed Murrelet survey stations located on the Shiretoko Oudan Douro pass road in Shiretoko National Park, Hokkaido, Japan.

Methods

On the Shiretoko Peninsula, locations for inland survey stations were selected by reviewing available information on habitat types and using our knowledge of Marbled Murrelet habitat associations in North America (Hamer and Nelson 1995). We explored forested areas in the park for the presence of potential nest platforms (>10 cm in diameter). We attempted to minimize biases in our searches by considering both coniferous and deciduous trees as potential nest sites. Potential nest platforms were uncommon on the peninsula, therefore survey stations were placed (1) in mixed species forests with the largest potential platforms available, and (2) in major drainages that murrelets might use as flight corridors to inland nesting sites. In addition, because murrelets are known to nest on the ground, we surveyed alpine and rock talus areas. Our survey stations were located near the 1993 stations but not in the same location (Figures 2 - 4).

Twenty-two survey stations were established on the Shiretoko Peninsula, 15 on the Utoro side and 7 on the Rausu side of the peninsula (Table 1, Figures 3 - 6).

forms). Therefore, 15 stations were surveyed. These stations were located in forests ($n = 4$), along rivers adjacent to forests ($n = 7$), in a meadow adjacent to forest and with a view of alpine ($n = 1$), or near rock talus slopes in alpine areas ($n = 3$). All stations were placed in openings in the forests or along ridges to maximize the chances of hearing and seeing murrelets. Due to the abundance of brown bears (*Ursus arctos yesoensis*) in the park in 1996, hiking trails and the back-country were closed within Shiretoko National Park. Survey stations were therefore established along existing paved or gravel roads.

At Mt. Mokoto, surveys were conducted near the top of the mountain in one of the only remaining areas of potential habitat areas (the forested area where an adult was collected in 1961 was logged and, therefore, is no longer suitable). Three survey stations were established, two along the Mt. Mokoto Pass Road that provided views into adjacent conifer forest and one in the Mt. Mokoto campground, an area surrounded by large conifer trees (Table 2, Figure 2).

Intensive surveys for murrelets were conducted between 1 and 6 July 1996 (1

Kitaysky 1995), support the high probability of Long-billed Murrelets nesting on Hokkaido.

In the future, additional inland surveys need to be conducted on Mt. Mokoto, the Shiretoko Peninsula, and other areas of suitable habitat in Japan. However, we suggest that surveys for birds on the water in the Sea of Okhotsk and Nemuro Strait be completed first to determine the distribution of murrelets off northeastern Hokkaido in summer, as there appears to be a correlation between at-sea distribution and the distribution of murrelets at inland nesting sites (Nelson et al. 1992, Ralph et al.

1995). During these surveys, particular attention should be paid to the presence of hatch-year birds. Once the at-sea distribution of Long-billed Murrelets is known, specific areas can be identified for conducting inland surveys.

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Literature Cited

American Ornithologists' Union. 1997. Check-list of North American birds, 41st supplement. *Auk* 114:542-552.

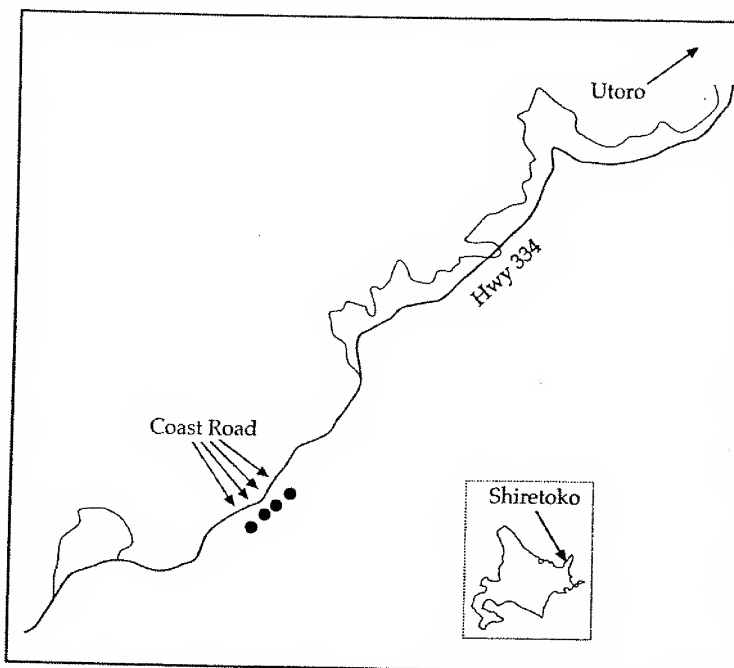


Figure 5. Map of the Long-billed Murrelet survey stations located along the Coast Road, south of Utoro on the Shiretoko Peninsula, Hokkaido, Japan.

Brazil, M.A. 1991. The birds of Japan. Smithsonian Institution Press, Washington, D.C. 466 pp.

Carter, H.R., and L. de Forest. 1993. Pacific Seabird Group goes to Japan: Part 1. *Pacific Seabird Group Bull.* 20: 14-17.

Guignet, C.J. 1956. Enigma of the Pacific. *Audubon* 58:164-167, 174.

Hamer, T.E., and S.K. Nelson. 1995. Characteristics of Marbled Murrelet nest trees and nesting stand, pp. 69-82. *In Ecology and conservation of the Marbled Murrelet.* (Ralph, C.J., G.L. Hunt, Jr., J.F. Piatt, and M.G. Raphael, eds.) U.S. Department of Agriculture, Forest Service General Technical Report PSW-GTR-152, Albany, CA.

Helm, R.C., H.R. Carter, S.H. Newman, J.N. Fries, K. Ono, and M. Sato. 1997. Seabird injury and wildlife care during the 1997 *Nakhodka* oil spill in the Sea of Japan: observations and recommendations by a team of U.S. scientists and Japanese seabird researchers. Unpublished report, U.S. Fish and Wildlife Service, Ecological Services, Portland, OR; U.S. Geological Survey, Biological Resources Division, California Science Center, Dixon, CA; and University of California, Wildlife Health Center, Davis, CA.

Kistchinski, A.A. 1968. Birds of the Kolymaskogo Nagoria. Nauka Publishing House, Moscow, USSR.

Kondratyev, A.Y., and V.A. Nechaev. 1989. Marbled Murrelet, pp. 142-143. *In Rare vertebrates of the Soviet Far East and their protection.* (Kostenko, V.A., P.A. Ler, V.A. Nechaev, and Y.V. Shibaev, eds.) (In Russian).

Konyukhov, N.B., and A.S. Kitaysky. 1995. The Asian race of the Marbled Murrelet, pp. 23-29. *In Ecology and conservation of the Marbled Murrelet.* (Ralph, C.J., G.L. Hunt, Jr., J.F. Piatt, and M.G. Raphael, eds.) U.S. Department of Agriculture, Forest

Service General Technical Report PSW-GTR-152, Albany, CA.

Kuzyakin, A.P. 1963. On the biology of the Marbled Murrelet. *Ornitologiya*

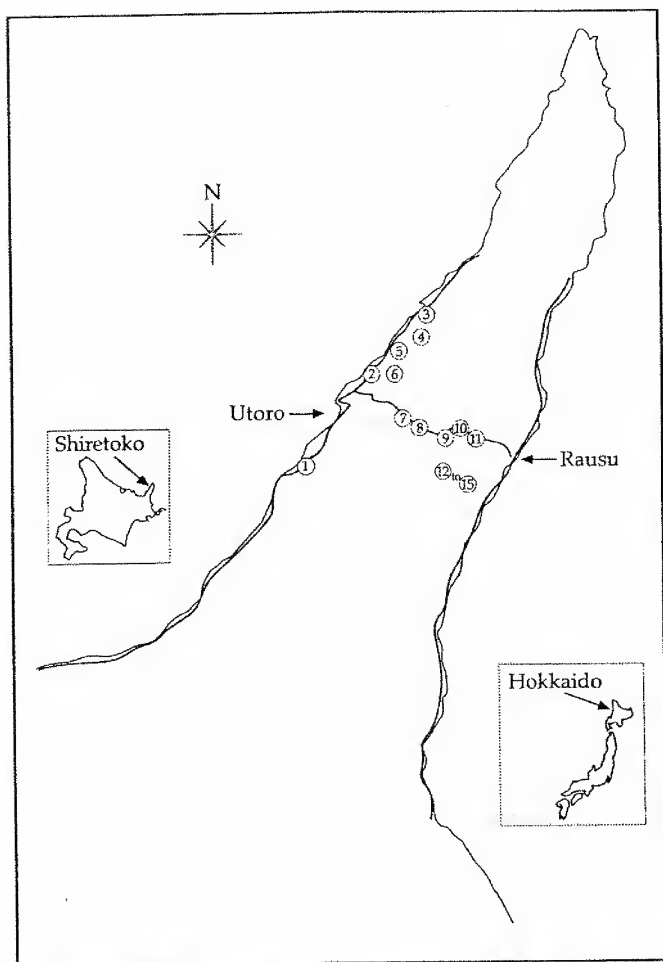
6:315-320. (In Russian; English translation in Van Tyne Memorial Library, Univ. Michigan, Ann Arbor, MI).

Labzyuk, V.I. 1987. A sudden occurrence of the nest of *Brachyramphus marmoratus* in Southern Primorye, pp.85-86. *In Distribution and biology of seabirds of the Far East.* Litvinenko, N.M. (ed.). Akademiya Nauk SSSR, Vladivostok, USSR. (In Russian; English translation by P. T. Gilbert).

Nechaev, V.A. 1986. New data on the seabirds of Sakhalin Island, pp. 71-81. *In Seabirds of the Far East.* (Litvinenko, N.M., ed.) Akademia Nauk SSSR, Vladivostok, USSR. (In Russian; English translation by D. Siegel-Causey).

Nelson, S.K. 1997. Marbled Murrelet (*Brachyramphus marmoratus*). *In The Birds of North America*, No. 276. (Poole, A. and F. Gill, eds.) The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

Nelson, S.K., M.L.C. McAllister, M.A. Stern, D.H. Varoujean, and J.M. Scott. 1992. The Marbled Murrelet in Oregon, 1899-1987, pp. 61-91. *In Status and Conservation of the Marbled Murrelet in North America.* (Carter, H.R. and M. Morrison, eds.) Proceedings of the Western Foundation of Vertebrate Zoology 5(1).



Ohtaishi, N., and N. Nakagawa. 1988. Animals of Shiretoko: vertebrate fauna in their natural state and their conservation on the Shiretoko Peninsula, Hokkaido, Japan. Hokkaido University Press, Sapporo, Japan.

Ralph, C.J., S.K. Nelson, M.M. Shaughnessy, S.L. Miller, and T.E. Hamer. 1994. Methods for surveying Marbled Murrelets in forests: a protocol for land management and research. Pacific Seabird Group, U.S. Forest Service, Redwood Sciences Lab, 1700 Bayview Drive, Arcata, CA.

Ralph, C.J., G.L. Hunt, Jr., J.F. Piatt, and M.G. Raphael. 1995. Ecology and conservation of the Marbled Murrelet in North America: Overview, pp. 3-22. In Ecology and conservation of the Marbled Murrelet. (Ralph, C.J., G.L. Hunt, Jr., J.F. Piatt, and M.G. Raphael, eds.) U.S. Department of Agriculture, Forest Service General Technical Report PSW-GTR-152, Albany, CA.

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Figure 6. Map of the Shiretoko Peninsula, Hokkaido, Japan, showing the location of Utoro and Rausu, and the 1996 Long-billed Murrelet survey stations. Numbers correspond to the survey site numbers listed in Table 1.



Some of the Long-billed Murrelet survey team members, top, left to right, Takeo Akama and John Fries, bottom, right to left, Mihoko Sato, Koji Ono, and Yasuhiro Kawasaki.

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Table 1. Site names and locations of Long-billed Murrelet survey stations, and dates of surveys on the Shiretoko Peninsula, Hokkaido Island, Japan, 1996. Numbers (#) correspond to the survey station locations in Figure 6. The Site Names are listed with the station locations in Figures 3 - 5.

#	Site Name	Location	Side of Peninsula ¹	Latitude/ Longitude	No. Stations ²	Dates of Surveys	Habitat Type
1	Coast Road	Gravel road above Hwy 334	NW	N44° 02.084' E144° 56.996'	4	4, 5, 6 July	Mixed forest
2	Canyon	Road above Ewao-betsukawa ^{3,4}	NW	N44° 06.306' E145° 02.666'	3	3, 6 July	River drainage, mixed forest
3	Overlook	Road above Idashi-betsugawa ^{3,4}	NW	N44° 06.175' E145° 03.792'	2	3 July	River drainage, mixed forest
4	Upper Valley Overlook	Road above Idashi-betsugawa ^{3,4}	NW	N44° 07.823' E145° 06.147'	1	5 July	River drainage, mixed forest
5	Meadow Junction	Gravel road along meadow ⁴	NW	N44° 07.145' E145° 04.644'	1	4 July	Meadow, mixed forest, alpine
6	Onsen	Road along Iwao-betsukawa ³	NW	N44° 08.271' E145° 06.653'	1	6 July	River drainage, mixed forest
7	Alp1	Along pass road from Utoro to Rausu ⁵	NW	N44° 04.102' E145° 04.702'	2	3, 4 July	Birch forest, alpine
8	Alp 2	Along pass road from Utoro to Rausu ⁵	NW	N44° 03.664' E145° 05.486'	1	5 July	Birch forest, alpine
9	Rausu Alp 1	Along pass road from Utoro to Rausu ⁵	SE	N44° 02.396' E145° 06.236'	1	n/a	Birch forest, alpine
10	Rausu Alp 2	Along pass road from Utoro to Rausu ⁵	SE	N44° 02.032' E145° 06.418'	1	n/a	Birch forest, alpine
11	Bridge	Along pass road over Shunrobashikawa ^{3,5}	SE	N44° 01.841' E145° 08.392'	1	n/a	River drainage, mixed forest
12	Valley	Gravel road along unknown river	SE	N43° 56.715' E145° 04.224'	1	n/a	River drainage, mixed forest
13	View	Gravel road along unknown river	SE	N43° 56.529' E145° 04.196'	1	n/a	River drainage, mixed forest
14	Fork	Gravel road along unknown river	SE	N43° 56.333' E145° 04.182'	1	n/a	River drainage, mixed forest
15	John	Gravel road along unknown river	SE	N43° 56.495' E145° 05.094'	1	n/a	River drainage, mixed forest

¹ NW = northwest (Utoro side), SE = southeast (Rausu side).

² Not all stations surveyed on each date.

³ River name.

⁴ Along Shiretoko Kooen-sen road.

⁵ Along Shiretoko Oudan Douro pass road or Hwy 334.

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Table 2. Name and location of Long-billed Murrelet survey stations and date of survey at Mt. Mokoto, Hokkaido Island, Japan, 1996. The Site Names are listed with the station locations in Figure 2.

#	Site Name	Location	Latitude/ Longitude	No. Stations	Date of Surveys	Habitat Type
1	Mt. Mokoto Campground	gravel parking area	N43° 42.506' E144° 21.057'	1	1 July	mixed forest
2	Mt. Mokoto Pass Road	pass road	N43° 42.568' E144° 20.959'	2	1 July	mixed forest

Appendix.

Itinerary of our trip to search for Long-billed Murrelets on Hokkaido Island, Japan, 1996. See Tables 1 and 2 for names of the survey stations and dates of surveys. See acknowledgments for full names of scientists and surveyors.

26 June

North American contingent (Nelson, Hamer, Wright, Leschner, Gaston, Stephen Kress) leaves the U.S. and Canada. Some of the Japanese contingent (Ono, Fries, Otsuki, Akama, Sato) board Blue Highway Line ferry from Tokyo to Tomakomai, Hokkaido.

27 June

Arrive in Tokyo, then fly to Sapporo, Hokkaido. Nelson, Hamer, Wright, Leschner, Gaston and Kress meet with Yuri and Yataka Watanuki in Sapporo. Stay in hotels.

28 June

Meet with Ono, Fries, Otsuki, Akama, Sato in Sapporo. Drive to Haboro-cho on the west coast of Hokkaido. Stay at Gyo-son Kankyo Hozen Sogo Center (youth hostel), others at Hotel Haboro.

29 June

Attend International Seabird Forum, Symposium on Ecological and Conservation Studies of the Alcidae, hosted by the town of Haboro. Leschner, Gaston and Kress, along with Japanese scientists (Haruo Ogi, Yutaka Watanuki, Nariko Oka, and Takaki Terasawa), present data on alcid research. In late afternoon take ferry to Teuri Island. At dusk, visit the largest Rhinoceros Auklet colony in the world.

Stay at Teuri Island Research Center, others in hotel.

30 June

Take bus and boat tour of Teuri Island. International Seabird Forum continues; Leschner, Gaston, Kress, and Otsuki stay at meetings. Ono, Fries, Nelson, Hamer, Wright, Fukuda, Akama, and Sato take ferry back to Haboro-cho, meet with Kawasaki, and drive to Mt. Mokoto in northcentral Hokkaido. Camp in campground at top of mountain.

1 July

Conduct Long-billed Murrelet surveys at 3 stations (9 people) on Mt. Mokoto. No detections. Drive to Shiretoko Peninsula in northeastern Hokkaido. Meet with Park Ranger, Matsuda, to get information on vegetation and possible places to locate survey stations. Leschner, Gaston, and Otsuki meet up with us; Kress returns to U.S. Set up camp at Utoro Campground.

2 July

Establish survey stations in Shiretoko National Park (Utoro and Rausu sides) and along the Coast Road. Meet with Matsuda again about vegetation and locating survey stations. Gaston and Leschner take boat ride along Utoro side of peninsula to look for murrelets on the water. None are sighted. Camp at Utoro Campground.

3 July

Conduct surveys; 12 people at 6 stations. No detections. Flag more stations on Rausu side of peninsula. Camp at Utoro Campground.

4 July

Conduct surveys; 12 people at 5 stations. Possible detections on Coast Road. Hotes and Yuichi arrive. Meet with Park Ranger Tazawa about vegetation on Rausu side of peninsula. Camp at Utoro Campground.

5 July

Conduct surveys; 13 people at 5 stations. Possible detections on Coast Road. Gaston leaves for touring Japan. Camp at Utoro Campground.

6 July

Conduct surveys; 13 people at 5 stations. No detections. Camp at Utoro Campground.

7 July

Hamer and Leschner fly back to U.S. Hotes and Yuichi leave for home. The rest of us drive to the town of Nakashibetsu and the Kushiro Shitsugen Refuge to see Japanese Cranes, then on to Kirritapu. Stay in government cabins.

8 July

Birdwatch and explore Kirritapu. Stay in government cabins.

9 July

Drive to Kushiro. Ono, Fries, Akama, and Sato return to Tokyo via ferry or plane. Kawasaki leaves for home. Nelson, Wright, Fukuda, and Otsuki drive to Sapporo.

10 July

Fukuda returns to Teuri Island. Nelson, Wright, and Otsuki fly to Tokyo.

THE APPEARANCE OF TICKS AMONG NESTLING ANCIENT MURRELETS AT REEF ISLAND, BRITISH COLUMBIA

Anthony J. Gaston and Christine Adkins

The occurrence of ticks (*Ixodes* spp.) on colonial seabirds and their nestlings is well documented (King et al. 1977, Duffey 1980) and may cause significant harm to nestlings under some circumstances (Morbey 1995). During intensive studies of Ancient Murrelet (*Synthliboramphus antiquus*) chicks at Reef Island, British Columbia during 1984-89 and in 1995, we noticed no sign of ticks, either on chicks or adults. However, in 1997, ticks were detected on the webs or toes of 19% (186 of 985) chicks captured while departing from the colony.

The number of ticks counted per individual varied up to 11, with most chicks affected by only one or two (76%). The proportion of chicks parasitized declined over the season (Figure 1) from 22% among the first 30% of chicks departing

deer mice (*Peromyscus maniculatus*) are another possible vector. Newly-excavated burrows may be less likely to be infested than those that have been in use for several years. The time of night effect may also be related to the timing of departure of experienced and inexperienced birds, with the more experienced, presumably those using older burrows, being more likely to depart between 01.00-02.00 PST: the darkest period of the night at Reef Island.

This appears to be the first record of ticks on Ancient Murrelets (Gaston 1994). The rapidity with which the infestation appears to have spread is remarkable.

From a total absence within our study area (about 15%

of the colony area) in 1995, a minimum of 19% of burrows appear to have been affected by 1997. In addition to about 7000 pairs of Ancient Murrelets, the island also supports about 2000 pairs of Cassin's Auklets (*Ptychoramphus aleuticus*) (Rodway 1991), the nestlings of which are heavily parasitized by ticks at some colonies in British Columbia

(Morbey 1995, R. Kelly, pers. comm.). Although we have not recorded ticks on Cassin's Auklet chicks at Reef Island, it seems that contact with auklets, whose burrows are interspersed among Ancient Murrelet burrows in some areas, is a possible means by which ticks began to parasitize the murrelets.

We saw no sign of any damage to the chicks resulting from tick parasitism: all webs appeared intact. This is in contrast to Cassin's Auklet chicks which show frequent signs of web damage and grow more slowly when heavily parasitized (Morbey 1995). Because Ancient Murrelet chicks

spend only 2 days in the burrow, the ticks presumably have insufficient time to cause tissue damage. Reduced effects of parasitism may be an additional benefit accruing to Ancient Murrelets as a result of their precocial departure strategy.

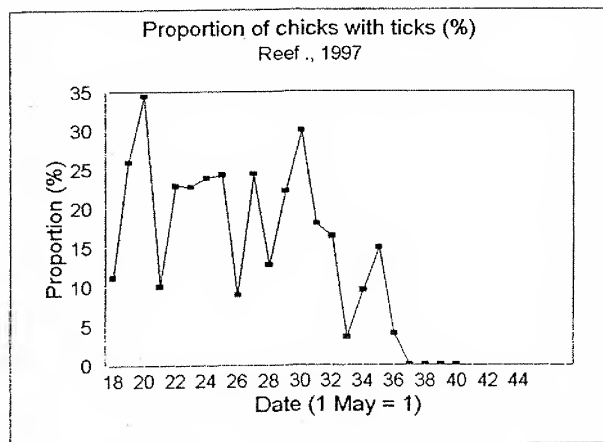


Figure 1. Proportion of Ancient Murrelet chicks with ticks over time.

(<23 May) to 9% among the last 10% (>31 May). In addition, there appeared to be some correlation with the time of departure during the night, the proportion of chicks parasitized being highest in the middle of the departure window, between 01.00-02.00 h PDT (Figure 2).

Chicks departing late in the season may be the offspring of first-time breeders, many of which use newly-excavated burrows (Gaston 1992). As most Ancient Murrelet burrows are more than 1 m from one another, ticks could be spread from burrow to burrow by prospecting birds that enter several burrows in a single night:

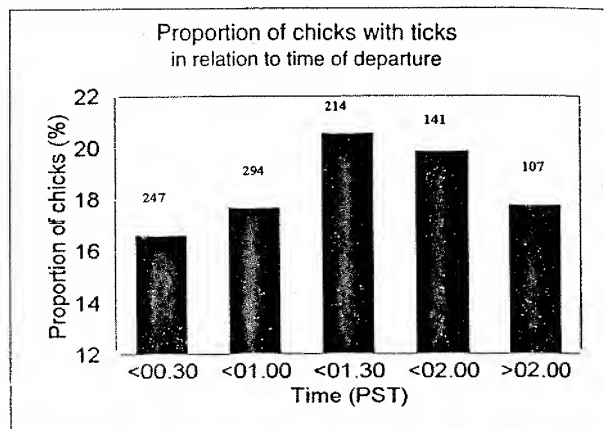


Figure 2. Proportion of Ancient Murrelet chicks with ticks at time of departure.

References Cited

- Duffy, D.C. 1980. Comparative reproductive behaviour and population regulation of seabirds of the Peruvian coastal current. Ph. D. Thesis, Princeton University.
- Gaston, A.J. 1992. The Ancient Murrelet. T. And A.D. Poyser, London.
- Gaston, A.J. 1994. Ancient Murrelet (*Synthliboramphus antiquus*). In The Birds of North America, No. 132 (A. Poole and F. Gill, Eds.) Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.
- King, K.A., D.R. Blankinship, R.T. Paul, and R.C. Rice. 1977. Ticks as a factor in the 1975 nesting failure of Texas Brown Pelicans. Wilson Bulletin 89: 157-158.
- Morbey, Y.E. 1995. Fledging variability and the application of fledging models to the behaviour of Cassin's Auklet (*Ptychoramphus aleuticus*) at Triangle Island, British Columbia. M.S. thesis, Simon Fraser University, Burnaby, BC.
- Rodway, M.S. 1991. Status and conservation of breeding seabirds in British Columbia. In Seabird status and conservation: a supplement (J. P. Croxall, ed.), pp.

3-102. International Council for Bird Preservation: Cambridge, UK.

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[This is a peer reviewed article.]

FIRST BREEDING RECORDS OF SLATY-BACKED GULL (*LARUS SCHISTISAGUS*) FOR NORTH AMERICA

Brian J. McCaffery, Christopher M. Harwood, and J. R. Morgart

As a breeding species, the Slaty-backed Gull (*Larus schistisagus*) is limited to the Asiatic coasts of the North Pacific and the Bering Sea, primarily around the Sea of Okhotsk and along the east coast of the Kamchatka Peninsula (American Ornithologists' Union 1983, Harrison 1983). The only previous breeding record in North America, in northwestern Mackenzie, has been seriously questioned (American Ornithologists' Union 1983). In Alaska, the species is a rare spring migrant and summer and fall visitant along the coasts of the Bering and Chukchi seas (Kessel and Gibson 1978). Evidence for breeding in Alaska is limited to a territorial bird at Shaiak Island in northern Bristol Bay on 12 July 1990 (Petersen et al. 1991). We report here the first confirmed breeding records of Slaty-backed Gulls in North America near Cape Romanzof, Alaska.

Cape Romanzof projects into the Bering Sea at the western end of the Askinuk Mountains (61°49'N, 166°5'W) on Yukon Delta National Wildlife Refuge. Beginning 3 km south-southwest of the cape, Aniktun Island runs south for 5.5 km across the mouth of Kokechik Bay. Aniktun is a low, sandy, barrier island averaging about 400 m in width. In 1996 and 1997, the island supported a Glaucous Gull (*L. hyperboreus*) breeding colony.

On July 3, 1996, BJM and JRM visited Aniktun Island. As they approached the island, they saw a Slaty-backed Gull sitting upon a nesting mound near the eastern shoreline, about 2 km south of the island's north end. The bird's mantle color was near the dark extreme described by Gustafson and Peterjohn (1994). The gull flushed from the nest when BJM approached to within 500 m. As BJM approached, and after he arrived at the nest, the adult circled overhead and gave alarm calls.

The nest mound was 0.25-0.5 m high, and consisted primarily of dead vegetation. The nest was built in an expanse of unvegetated sand, and was located >10 m from the nearest Glaucous Gull nest. The nest bowl contained a single egg, and was very similar in both size and construction to the most well-developed Glaucous Gull nests found elsewhere on the island. BJM photographed both the nest and the adult circling overhead (copies of photographs are on file at the University of Alaska Museum, Fairbanks, Alaska). While censusing the rest of the island, BJM saw both an adult and a third summer Slaty-backed Gull near the south end. Although 138 other gull nests were located on the island (primarily Glaucous Gulls, but also a few Glaucous-winged [*L. glaucescens*] and Glaucous x Glaucous-winged hybrids), no additional Slaty-backed Gull nests were found.

While BJM censused elsewhere on the island, JRM noticed the incubating bird returning to and settling on its nest. Later, JRM observed a second Slaty-backed Gull, as dark-mantled as the first, landing 5-10 m from the incubating bird. Although we could not confirm their relationship, it is likely that the second Slaty-backed Gull was the incubating bird's mate.

On July 3, 1997, CMH, JRM, and an assistant returned to Aniktun Island to census seabirds. We once again found a pair of nesting Slaty-backed Gulls, with a 3-egg clutch. As in 1996, both members of the pair had extremely dark mantles. The nest was 2 m from a Glaucous Gull nest, within a group of about 10 Glaucous Gull nests which comprised the easternmost nesting cluster on the island. The Slaty-backed Gull nests found on Aniktun Island in 1996 and 1997 represent the first confirmed breeding records of the species in North America.

Acknowledgments

The observations reported here were made during the course of an ornithological inventory of Cape Romanzof Long Range Radar Site and surrounding Yukon Delta National Wildlife Refuge lands. We thank Gene Augustine of the United States Air Force for his support of this cooperative project between the U.S. Fish and Wildlife Service and the U. S. Air Force. We also thank the staff of Cape Romanzof Long Range Radar Site for logistical support, and Heather Moore for assistance in the field in 1997.

References Cited

- American Ornithologists' Union. 1983. Check-list of North American birds, 6th edition. American Ornithologists' Union, Washington, D.C.
- Gustafson, M. E., and B. G. Peterjohn. 1994. Adult Slaty-backed Gulls: variability in mantle color and comments on identification. *Birding* 26: 243-249.
- Harrison, P. 1983. Seabirds, an identification guide. Houghton Mifflin Company, Boston, MA. 448 pp.
- Kessel, B., and D. D. Gibson. 1978. Status and distribution of Alaska birds. *Studies in Avian Biology* 1. 100 pp.
- Kessel, B. 1989. Birds of the Seward Peninsula, Alaska. University of Alaska Press. 330 pp.
- Petersen, M. R., D. N. Weir, and M. H. Dick. 1991. Birds of the Kilbuck and Ahklun Mountain Region, Alaska. *North American Fauna* 76. 158 pp.

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[This is a peer reviewed article.]

MORIBUND MURRES: AN APPARENT OUTBREAK OF SICKNESS AMONG THICK-BILLED MURRES AT COATS ISLAND, NORTHWEST TERRITORIES

Anthony J. Gaston

Outbreaks of disease among birds breeding in colonies have been frequently documented but, as far as I am aware, there are no accounts of illness among breeding murres. This note describes some symptoms and mortality observed among Thick-billed Murres (*Uria lomvia*) at Coats Island, NWT, Canada, in the summer of 1997, in the hope of stimulating communication on the topic.

On 16 July, a murre sitting at a breeding site on plot DA seemed to be in an unusual pose and was not seen to move. After prolonged observation confirmed that it was either dead or in a coma, we decided to retrieve the carcass. While climbing down to collect it, a second dead bird was found on a breeding site about 3 m away. Both birds had full brood patches. One still had the egg tucked into its brood-patch, while the other had slumped off the egg: both had apparently died while incubating and both had one eye closed and apparently "shrunken."

One individual had been banded as a breeder in 1993, at a site approximately 4 m away, the other was unbanded. The banded bird had weighed 990 g in 1993 and weighed 880 g when collected. The other bird weighed 850 g. Both of these weights are well below normal for incubating birds at this colony: nine incubating breeders weighed between 28 July and 4 August averaged 1020 g (sd 57 g). However, they are well above the weights recorded for starved Thick-billed Murres found dead in winter (mean 660 g, n = 5, unpublished data).

On 18 July, at a breeding site about 50 m from those where the birds had died (Q25), I observed a bird (banded light-green/metal) with one eye partially closed and rimmed with some sort of exudate. It was behaving very strangely, lolling across the back of its incubating partner (orange/metal), its head flopping loosely in a very abnormal manner. From time to time, it perked up and behaved normally for a few minutes and during some of these interludes it performed a change-over on the egg. However, within 1-2 minutes it had allowed the egg to slip from its brood patch, whereupon its mate resumed incubation. These double incubation exchanges happened 3 times in less than 30 minutes.

The next day the sick bird still had one eye partially closed, but was no longer lolling about. However, it continued to show little interest in incubation and a few moments after change-over with its mate it stood up, allowing the egg to roll aside and stood at its site, ignoring the egg and sleeping intermittently. The mate continued to incubate normally, so that the egg was being incubated only about 2/3 of the time. This behaviour continued until 24 July, with the sick individual gradually taking greater interest in incubation until its behaviour finally became normal. The shrunken eye gradually improved until, by 1 August no sign of shrinkage could be detected. The egg was a replacement laying and had still not been incubated for 33 days (normal incubation period) when we departed on 18 August.

The shrunken eye (only one eye in each case) linked the two dead birds with the sick individual. The proximity in time and space also suggested that whatever malady caused the death of the incubating birds was the same that produced the symptoms described for light-green/metal.

The period during which the mortality occurred was an especially warm one, with maximum shade temperatures of 14-21° C. during 11-15 July (the hottest period of the summer and the highest temperature ever recorded at our camp in 14 years) and 18° on 18 July. Temperatures read from the backs of incubating birds using an infra-red thermometer exceeded 40° C occasionally. During this period, many incubating birds showed the influence of heat stress, gaping, panting and spreading their wings to allow additional air circulation. A few birds left their eggs, apparently in response to overheating. Coats Island experiences the highest maximum temperatures of any of the large Canadian Thick-billed Murre colonies. Whether the deaths and abnormal behaviour might be a direct effect of heat-stress, rather than a result of some infectious disease is not known. I would be interested to hear of any similar observations from elsewhere.

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[This is a peer reviewed article.]

FIRST NESTS OF CASPIAN TERNS (*STERNA CASPIA*) FOR ALASKA AND THE BERING SEA

Brian J. McCaffery, Christopher M. Harwood, and John R. Morgart

Caspian Terns (*Sterna caspia*) are nearly cosmopolitan, breeding across much of North America, Eurasia, southern Africa, and Australia (American Ornithologists' Union 1983, Harrison 1983). In recent years, the species has been expanding its breeding range north along the coast of the northeast Pacific (Gill and Mewaldt 1983, Campbell et al. 1990). The species was first detected in southeast Alaska in 1981, when several were

sighted near Ketchikan and Sitka (Gibson and Kessel 1992). As predicted by Gill and Mewaldt (1983), Caspian Terns apparently began breeding in Alaska soon after reaching the state. Most observations in Alaska since 1981 are from the southeast and south coastal regions, with the majority concentrated around Prince William Sound (Gibson and Kessel 1992). Adults and young-of-the-year are detected annually in this area, particularly near

Cordova and the Copper River Delta (Tobish 1994a), where the species is suspected of nesting since the late 1980's (Tobish 1994b). To date, however, no Caspian Tern nests have been discovered in Prince William Sound, or elsewhere in the state. We report here the first confirmed nestings of Caspian Terns in Alaska.

On June 5, 1994, BJM spotted an adult Caspian Tern patrolling the surf line at

Windy Cove, 1.8 kilometers east of Cape Romanzof (61°48' N, 166°05' W) on the coast of the Yukon-Kuskokwim Delta. This was the first Bering Sea record for the species since the 1880's (Nelson 1887), and the westernmost in Alaska (Tobish 1994a).

On June 3, 1996, BJM spotted an adult Caspian Tern foraging <100 m from shore 6 km northeast of Cape Romanzof. He saw another near the same location on June 11. After patrolling parallel to the shoreline, the tern flew offshore toward Neragon Island (61°53' N, 165°58' W), a low (<1 m), unvegetated, sand island 5 km to the north-northeast.

On July 2, 1996, CMH and JRM visited the southern end of Neragon Island. In a loose colony of Glaucous Gulls (*Larus hyperboreus*), they found a pair of nesting Caspian Terns. One adult flushed from the nest as they approached, and both circled overhead. The nest (Nest 1) contained 4 eggs. On July 5, 1996, BJM, CMH, and JRM visited Neragon Island to conduct an island-wide seabird census. Nest 1 contained 1 dry chick, 1 pipped egg, and 2 unipped eggs. A few hundred meters farther north, we found a second pair of Caspian Terns with a 1-egg clutch, and several hundred meters north of that, a third pair and nest (also with 1 egg). Finally, we found a dry but recently hatched Caspian Tern chick (similar in size to the chick found at the first nest) in a Glaucous Gull nest between tern nests 2 and 3. Two adult Glaucous Gulls circled and alarm-called overhead, but we found no terns in the immediate vicinity of this nest. We only saw 6 adult Caspian Terns during the census, 2 associated with each of the 3 nests located. The origin of the chick in the Glaucous Gull nest is unknown.

We located all 3 nests along the long axis of the island, which was slightly higher and drier than the perimeter. Such sites are less likely to flood during storm tides, which can surround, but not necessarily inundate, the raised nests constructed by Glaucous Gulls elsewhere on the island. All 3 nests were in the lee of driftwood fragments where sand had accumulated. Nest 1 was a simple scrape in the sand 1 m from a 4 m-long log. There was no nest lining of any kind and no debris within 50 cm of the scrape. At nest 2, the single egg was 15 cm from a 1 m-long piece of driftwood, and the scrape was sparsely lined with a few bivalve shell fragments and vegetative debris. At nest 3, the egg was 13 cm from a 0.5 m

piece of driftwood, and the scrape was lined with driftwood twigs, dried sprigs of beach rye grass (*Elymus arenarius*), and a single feather.

On April 25, 1997, BJM initiated a coastal migration watch at Cape Romanzof. He saw 1 Caspian Tern fly north past Cape Romanzof on May 8, and 1-3 terns at the cape on 5 of the next 7 days. On July 2, 1997, CMH, JRM, and an assistant visited Neragon Island and located 3 Caspian Tern nests. Two nests were 11 m apart in a dry, sandy area just east of the longitudinal center of the island, and contained 5 and 3 eggs, respectively. The third nest (4 eggs) was located farther north along the wrack line in a Glaucous Gull colony on the west side of the island. The scrape abutted an 8-m long piece of driftwood, and included a few blades of dry grass and several broken pieces of bivalve shells. As in 1996, we saw only 3 pairs of adults on the island, all of which mobbed us as we checked their respective nests.

The 6 Caspian Tern nests on Neragon Island in 1996 and 1997 were the first to be found in Alaska. Individuals from the expanding population in the northeast Pacific (Gill and Mewaldt 1983, Campbell et al. 1990, Tweit and Gilligan 1991, Gibson and Kessel 1992) probably colonized Neragon Island, but this supposition is not certain. Neragon Island is over 1,100 km and 20° of longitude from the nearest suspected breeding site in North America (Prince William Sound). The nearest confirmed breeding sites for Caspian Terns in Canada are at Great Slave Lake, Northwest Territories (2,400 km to the east; Harrison 1983), and south coastal British Columbia (2,900 km to the southeast; Campbell et al. 1990), and Neragon Island is over 4,000 km from the nearest Asian breeding sites (American Ornithologists' Union 1983, Harrison 1983).

Despite the distance to Asian breeding sites, however, the possibility of colonization from Asia to the southwest cannot be dismissed, particularly in light of Caspian Tern wintering distributions on either side of the Pacific Ocean. Neragon Island is 4,300 km from the nearest Asian wintering area in Japan (Harrison 1983), but nearly 5,000 km from the Pacific coast of Mexico, the main wintering area of the population breeding along the Pacific coast of North America (Gill and Mewaldt 1983, Harrison 1983). In addition, Caspian Terns were observed on the Yukon Delta in the late 1800's (Nelson 1887), decades before the northward ex-

pansion of the population on the Pacific Coast of North America (Gill and Mewaldt 1983), and may have been birds of Asian origin.

There may also be no way to determine precisely when Neragon Island was colonized by Caspian Terns. In the late nineteenth century, Caspian Terns were considered occasional visitants along the Bering Sea coast between the Yukon River mouth and St. Michael (150-275 km north of Neragon Island), and the Yup'ik Eskimos of that era had a specific name for it (Nelson 1887). Despite extensive ornithological field work on the Yukon Delta in the century since then, however, no other Caspian Terns were documented until 1994. Whether the birds observed in the 1800's were part of a small or sporadic breeding population will never be confirmed. No Caspian Terns were nesting at Neragon Island in 1984 (Byrd 1984), the last time the island was visited by ornithologists prior to 1996. Because a bird was seen in the vicinity of Cape Romanzof in 1994, it is possible that the species was already breeding at Neragon Island at least as early as that date.

Acknowledgments

The observations reported here were made during the course of an ornithological inventory of Cape Romanzof Long Range Radar Site and surrounding Yukon Delta National Wildlife Refuge lands. We thank Gene Augustine of the United States Air Force for his support of this cooperative project between the U. S. Fish and Wildlife Service and the U. S. Air Force. We also thank the staff of Cape Romanzof Long Range Radar Site for logistical support, and Heather Moore for assistance in the field in 1997.

References Cited

- American Ornithologists' Union. 1983. Check-list of North American birds, 6th edition. American Ornithologists' Union, Washington, D. C.
- Byrd, G. V. 1984. Observations of flora and fauna in the Bering Sea unit, Alaska Maritime National Wildlife Refuge in July 1984. Unpublished United States Fish and Wildlife Service report, Alaska Maritime National Wildlife Refuge, Homer, AK.
- Campbell, R. W., N. K. Dawe, I. McTaggart-Cowan, J. M. Cooper, G. W. Kaiser, and M. C. E. McNall. 1990. The birds of British Columbia: Nonpasserines, Vol. 2. Royal British Columbia Museum, Victoria, BC.

ARTICLES

Gibson, D. D., and B. Kessel. 1992. Seventy-four new avian taxa documented in Alaska 1976-1991. *Condor* 94: 454-467.

Gill, R. E., Jr., and L. R. Mewaldt. 1983. Pacific coast Caspian Terns: dynamics of an expanding population. *Auk* 100: 369-381.

Harrison, Peter. 1983. *Seabirds: an identification guide*. Houghton Mifflin Company, Boston, MA.

Nelson, E. W. 1887. *Birds of Alaska*. In Report upon natural history collections made in Alaska between the years 1877 and 1881 (H. W. Henshaw, ed.). United States Army Signal Service Arctic Series 3: 35-222. United States Government Printing Office, Washington, D. C.

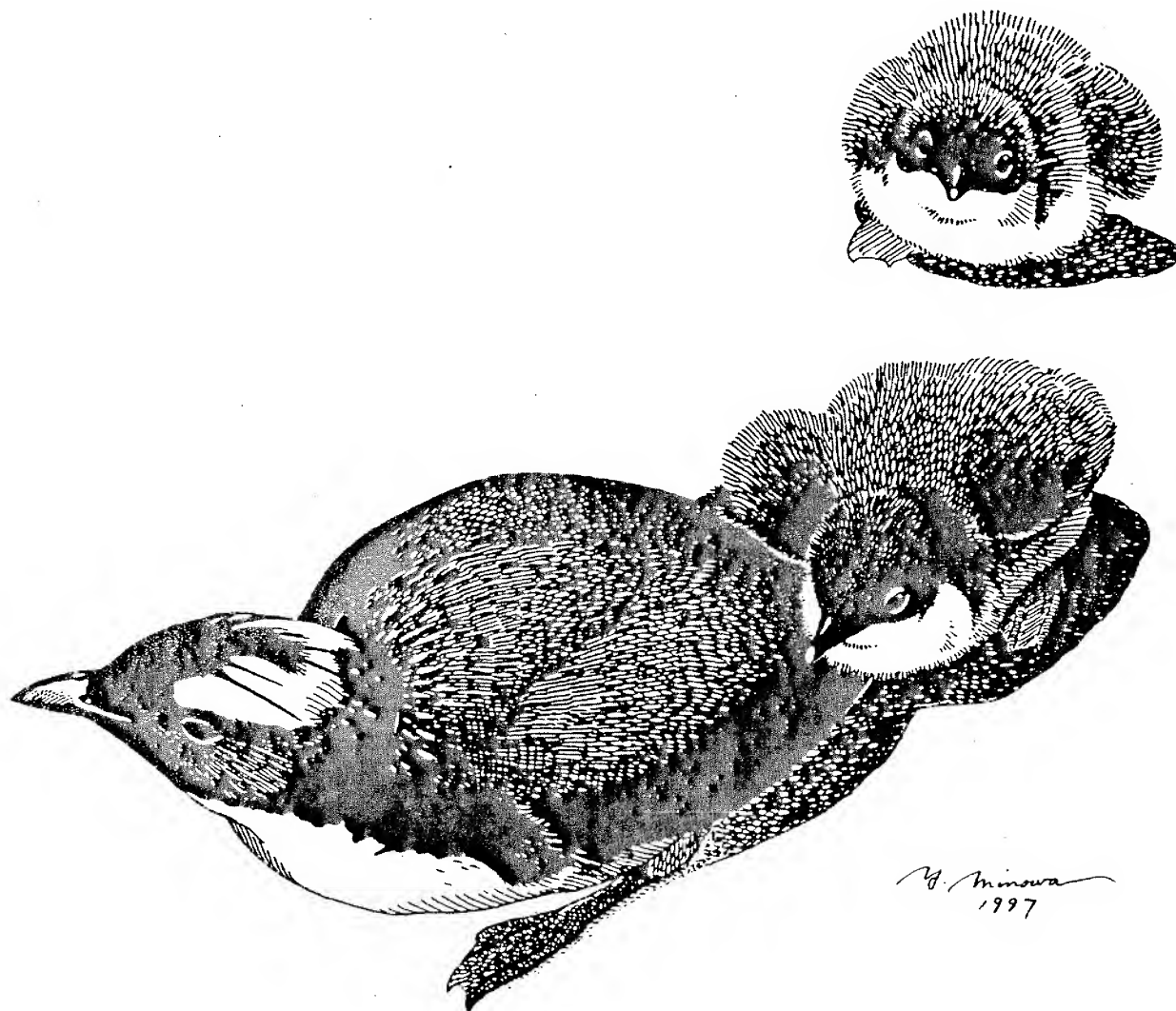
Tobish, T. G. 1994a. Alaska Region. *Field Notes* 48: 976-978.

Tobish, T. G. 1994b. Alaska Region. *Field Notes* 48: 330-332.

Tweit, B., and J. Gilligan. 1991. Oregon/Washington Region. *American Birds* 45: 489-491.

By *Brian J. McCaffery, Christopher M. Harwood, and John R. Morgart*, U. S. Fish & Wildlife Service, Yukon Delta National Wildlife Refuge, Post Office Box 346, Bethel, Alaska 99559 USA

[This is a peer reviewed article.]



CONSERVATION NEWS

ENDANGERED SPECIES ACT UPDATE

Congressional Reauthorization

In September, Senator Kempthorne (R-Idaho) unveiled a reauthorization bill for the Endangered Species Act that has a strong chance of enactment. It is co-sponsored by Senators Baucus (D-Mont), Chafee (R-RI) and Reid (D-Arizona), and is supported by Interior Secretary Babbitt. Thus the Kempthorne bill enjoys bipartisan support by the relevant chairmen of the Senate Committees and sub-Committees, as well as the Clinton administration. This bill may be considered by the full Senate when Congress returns from the holidays. No companion bill has yet been introduced in the House of Representatives.

The Kempthorne bill requires FWS to use better science in making listing decisions, and focuses on recovering listed species. Half of the 1,000 listed species have no recovery plans. The bill requires the U.S. Fish & Wildlife Service (FWS) to write recovery plans for all species within five years, half of which within three years. When new species are listed, draft recovery plans must be published within 18 months, and final plans must be published within 30 months of the listing. Organizations such as the Pacific Seabird Group would have more opportunities to participate in the recovery process.

The Kempthorne bill preserves the consultation process whereby FWS reviews activities of other agencies that require federal permits, and FWS can require modifications to those projects to prevent jeopardy to listed species. While FWS will retain the lead role in this process (a role that has been questioned), it will now have to make its decisions within 60 days. One complaint from both the regulated and the conservation communities has been that FWS frequently delays decisions indefinitely.

The Kempthorne bill establishes a "streamlined" program whereby landowners can develop multi-species habitat conservation plans (HCPs) on private property. It codifies the safe harbor agreements that the Clinton administration developed by regulation and includes the "no surprises" policy. Safe harbor agree-

ments guarantee landowners who implement habitat conservation plans that they would not be required to spend more money or conduct additional mitigation measures beyond the agreements they already make with the government. The fear that the federal government would not abide by its agreements in a habitat conservation plan dissuaded landowners from taking voluntary steps to preserve species and their habitats. Kempthorne also introduced a separate bill that provides incentives to landowners to take up voluntary habitat conservation practices.

At a September hearing on the Kempthorne bill, representatives of FWS generally supported it, but insisted that FWS be guaranteed sufficient funding to carry out its new responsibilities. Senator Chafee said, "don't let the vision of the perfect get in the way of good," and warned, "the chances that something very different from this gets passed are very slim. I would hope we all recognize that there are some things we'd all like changes to" but cannot get.

Despite wide support for most aspects of the Kempthorne bill, some raised concerns. FWS Director Jamie Clark said that the recovery planning and consultation deadlines may be hard to meet even with more funding. And although the Kempthorne bill incorporates changes responding to many of the concerns aired earlier this year by environmental groups "including new incentives to landowners to voluntarily conserve habitat, a streamlined consultation process and eliminating a controversial water rights section" some remain dissatisfied.

The National Wildlife Federation is concerned about requiring FWS to make section 7 decisions within 60 days because this may "authorize potentially destructive projects to go forward." The National Wildlife Federation said the Kempthorne bill "represents a step backward" in habitat conservation plans because FWS "will approve HCPs that undermine the Endangered Species Act's recovery goal." It also opposes the "no surprises policy" in habitat conservation plans, although this is already law in the Clinton administration. Habitat conservation plans have exposed a philosophical split among conservationists. Mike O'Connell, The Nature Conservancy, asked a May 1997 conference of envi-

ronmentalists, "do we want to protect or punish?" O'Connell noted that many environmentalists want to bring down private developers, even though owners of land with endangered species on may be no more real villains than people who live in suburbs and towns where the buffalo once roamed. Thus, this issue will continue to be debated by conservationists who agree on their goals but disagree on the means to achieve those goals.

Representative George Miller (D-Cal) has introduced a bill in the House, which expands regulation and citizen suit authority and establishes natural resources damages liability. Miller may have introduced the bill to set a benchmark in the House for other Endangered Species Act bills. An analyst for the Sierra Club said "we don't think Miller expects his bill to be referred out of committee." That prospect does seem unlikely, because House Resources Chairman Don Young (R-Alaska) strongly opposes Miller's bill, saying it would "decrease many existing private property rights for landowners throughout the nation" and would "gut" the no surprises policy that seeks to provide assurances to landowners who develop long-term habitat conservation plans.

Litigation May Force FWS to Designate More Critical Habitat

In a decision that may have widespread consequences for designating critical habitat for west coast seabirds and other listed species, the Ninth Circuit Court of Appeals in May ordered FWS to designate critical habitat for the California Gnatcatcher. *Natural Resources Defense Council v. U.S. Department of Interior* 113 F.3d 1121 (9th Cir. 1997). The court ruled that FWS's rules thwart congressional intent to require critical habitat to be identified simultaneously with the listing of a threatened or endangered species. Unless the Supreme Court overrules the decision, the Ninth Circuit has the last word on federal law in California, Oregon, Washington, Alaska and Hawaii. This case could force FWS to designate critical habitat for the first time for Newell's shearwaters, dark-rumped petrels, California least terns and brown pelicans (see "The Federal Endangered Species Act and Seabirds," *Pacific Seabirds*

21:22-23). FWS has designated critical habitat for Marbled Murrelets.

The court ruled that FWS "failed to discharge its statutory obligation to designate critical habitat when it listed the gnatcatcher as a threatened species, or to articulate a rational basis for invoking the rare imprudence exception." The Endangered Species Act requires that FWS designate critical habitat concurrently with listing a species as endangered or threatened "to the maximum extent prudent and determinable." Under FWS' rules, it is not prudent to designate critical habitat if, (1) identifying critical habitat can be expected to increase taking of the species; or (2) designation would not benefit the species.

The court stated that FWS' rationale that designation of critical habitat "increases the threat" to the species fails to balance the pros and cons of designation as Congress expressly required. The Court found that FWS improperly expanded a narrow statutory exemption for imprudent designations into a broad exemption for imperfect designations. The Department of Interior may appeal this decision to the Supreme Court.

By *Craig S. Harrison*, Washington, DC

FWS MAY LIST HARLEQUIN DUCK AS ENDANGERED

The U.S. Fish and Wildlife Service (FWS) is considering listing the eastern North America population of the harlequin duck (*Histrionicus histrionicus*) under the Endangered Species Act. FWS is responding to a petition by the Northern Rockies Biodiversity Project in Montana and the Biodiversity Legal Foundation in Colorado. These organizations contend that the eastern North America population of the harlequin duck has undergone a precipitous decline, that there are a number of threats to the population which will cause further declines, and that urgent protective measures are necessary.

In 1993, the Pacific Seabird Group sent copies of a report entitled "The Status of Harlequin Ducks in North America" to the directors of FWS and the Canadian Wildlife Service (Pacific Seabirds 21:23) and asked those agencies to investigate the status of this species. We noted then that there may be grounds to declare the eastern population endangered or threatened.

FWS suggests that the species may have undergone a precipitous decline in the late 1800s and early 1900s, and that a somewhat less precipitous decline has continued since then. Possible threats to the population include oil spills, land use practices, illegal hunting, and hydropower development. The population may also be vulnerable the loss of genetic diversity due to the low numbers of individuals.

FWS is soliciting information concerning: (1) whether the eastern North America population is distinct from the Pacific, Greenland, and Iceland populations; (2) the size and distribution of the eastern North America population; and (3) the status and trends of breeding and wintering groups of the eastern North America population. For further information, contact Linda Welch, FWS Maine Field Office (207) 827-5938.

By *Craig S. Harrison*, Washington, DC

WASHINGTON STATE SEABIRD PROTECTION MEASURES IN COMMERCIAL SALMON NET FISHERIES

The following measures have been adopted by the Washington State Department of Fish and Wildlife to reduce seabird net entanglement in Puget Sound commercial salmon net fisheries in 1997 and 1998. These actions are the result of joint Department, Washington State Sea Grant and fishing industries studies on seabird entanglement conducted since 1993. The original objective of the studies was to monitor marbled murrelet impacts under the Endangered Species Act of 1992. Although, Puget Sound net fisheries were determined to have minimal impacts on marbled murrelets based on monitoring during 1993 and 1994, numbers of other seabirds, especially common murre and rhinoceros auklets were observed to be entangled in nets with some resulting mortality. Since 1994, studies have been conducted to test gear modifications and area exclusions to reduce seabird entanglement.

Removal Of Purse Seine Corks

The Purse Seine Vessel Owners Association supported adoption of proposal to the Washington State Fish and Wildlife Commission to remove corks (floats) from four sections in the bunt (capture

end) of purse seine nets used in Puget Sound salmon fisheries to allow escape areas for seabirds encircled by the net. During monitoring studies observers and fishers observed that as the purse seine net was drawn around the encircled seabirds that particularly Rhinoceros Auklets were unable to either fly out of the net or climb over the corks. One fisher voluntarily removed several corks from the end of his net and seabirds were observed swimming out through the opening as the net was closed. The following year ten purse seine vessels participated in a study where five vessels removed corks and five vessels acted as a control. Although the results of seabird entanglement were not statistically significant between the two sets of vessels, observed use of the escape sections by seabirds resulted in voluntary support for the new regulation by the fishing industry. (For information about the Puget Sound purse seine seabird entanglement studies contact Jeff June at Natural Resources Consultants, Inc. Phone: 206-285-3480, email: jajfish@aol.com)

The exact language in the revised gear regulation (WAC 220-47-301) reads, "It shall be unlawful to take of fish for salmon with purse seine gear in Puget Sound unless at least four sections, each measuring no less than 12 inches in length, along the corkline in the bunt, and within 75 fathoms of the bunt have no corks or floats attached. These four sections must be spaced such that one section is along the corkline in the bunt, within 5 fathoms of the seine net, and the other three sections must be spaced at least 20 fathoms apart along the corkline within 75 fathoms of the bunt."

Gill net Gear Modification

Results of a 1995 and 1996 Washington State Sea Grant study indicated that a panel of white seine twine attached immediately below the corkline of gill nets is effective in reducing seabird entanglements. The Puget Sound Gill netters Association supported a proposal adopted by the Washington State Fish and Wildlife Commission to require such modifications to gill net vessels fishing in Puget Sound fisheries for sockeye and pink salmon in areas 7 and 7A (San Juan Islands to the Canadian border), beginning in 1998. (For a copy of the Washington State Sea Grant study and additional information on gill net entanglement studies contact: Mr. Ed Melvin, Washington State Sea Grant,



Apparently there is a significant probability that the El Nino event may be developing in the Pacific basin. During some past El Nino events populations of both Galapagos Penguins and Flightless Cormorants have declined greatly. After the 1982-83 El Nino, archipelago-wide censuses documented a 77% decline in penguins and a 50% decline in cormorants. Our preliminary results for 1997 documented that such declines are not occurring yet, but actual comparisons will have to await future censuses.

Galapagos Penguin

Penguins were sighted on the following islands: Isabela (878); Fernandina (323); Santiago (33); Bartolom (29), Sombrero Chino (19); Floreana (2); and Rbida (0). Groups of more

than 10 and up to 60 penguins were seen foraging together at sites on western Isabela and eastern Fernandina.

These large groups of penguins were not seen after the 1982-1983 Nino year. Of penguins whose age was determined, 17% were juveniles. No eggs and chicks were recorded. 21 adults were seen molting (they usually molt before breeding). During the census, penguins were observed feeding on large schools of sardines. Because Galapagos Penguins nest deep in holes within the lava coastlines of the islands, it is impossible to accurately quantify their reproductive effort in our censuses.

Flightless Cormorant

As usual, cormorants were only found on Isabela (536) and Fernandina (293). Cormorants appeared more affected by recent climatic events than penguins. The apparent decline in the number of cormorants compared to 1996, is also reflected in reproductive parameters. This year we found 64 active nests, 46 eggs and 13 chicks. These values represent declines of 30%, 27% and 15%, respectively. In 1996 we found 0.78 eggs and 0.39 chicks per active nest. This year we found 0.72 and 0.20 chicks per active nest. While the samples are not sufficient for statistical comparisons, it appears as though reproduction is reduced overall, rather than by interactions of components.

Phone: 206-543-9968, email: emelvin@u.washington.edu).

The exact language in the revised gear regulation (WAC 220-47-302) reads, "It shall be unlawful to take of fish for salmon with gill net gear beginning in 1998 in Areas 7 and 7A sockeye or pink fisheries unless said gill net gear is constructed so that the first 20 meshes below the corkline are composed of five-inch mesh white opaque minimum 210d/30 (#12) diameter nylon twine."

Gill Net Daily Hours

The Washington State Sea Grant studies on seabird entanglement in gill nets indicated that the morning change-of-light period had higher encounters of seabirds than full daylight or dark. Traditionally, gill net fisheries have been open for 24 hours periods including both morning and evening change of light periods. Beginning in 1997, gill net opening and closing hours were modified on a sliding date basis to avoid fishing during both change of light periods during area 7 and 7A (San Juan Islands to the Canadian border) sockeye and pink salmon fisheries.

High Seabird Abundance Area Restrictions

Both commercial purse seine and gill net fisheries are excluded from within 1,500 ft of shore in seabird, particularly marbled murrelet, areas of high abundance in the vicinity of the San Juan Is-

lands. Commercial net fishing in other areas is also restricted for other reasons each season. The areas restricted to reduce seabird entanglement include: Burrows Bay on the west side of Fidalgo Island; The northeast shoreline of Cypress Island; Two areas on the Southwest shoreline of Lopez Island; The northwest shoreline of Camano Island; and The entire coastline of Orcas Island except for East Sound

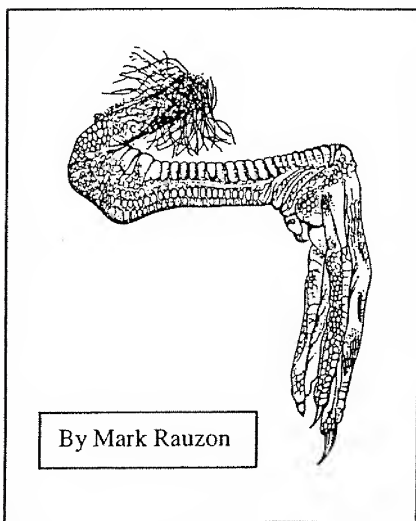
By Jeff June, Seattle, Washington

GALAPAGOS PENGUIN AND CORMORANT CENSUS - 1997

The annual census of Galapagos Penguins (*Sphensiscus mendiculus*) and Flightless Cormorants (*Nannopterum harisi*) was conducted from August 31 to September 9 1997. Personnel of the Galapagos National Park Service (GNPS) and Charles Darwin Research Station (CDRS) counted birds on all islands where they occur. 1284 penguins (883 adults, 184 juveniles and 217 of undetermined age) and 829 cormorants (778 adults, 8 juveniles and 43 of undetermined age) were counted. For penguins this total is 27% greater than the 1996 value. For cormorants, the total is 24% lower than the 1996.

It is tempting to speculate that cormorants may be responding to the high sea temperatures (evident this year), by declining populations while penguins are increasing. Actually, it is simply too early to address the relative responses at this time. However, the CDRS and GNPS will be closely monitoring the future fluctuations in these endemic populations.

By **Hernan Vargas, Howard Snell**, Charles Darwin Research Station, Charles Darwin Research Station Isla Santa Cruz, Galpagos Isla Santa Cruz, Galpagos, Ecuador, Ecuador. E-mail: hnanv@fcdarwin.org.ec and hoard@fcdarwin.org.ec and **Hector Serrano**, Galapagos National Park Service, Isla Santa Cruz, Galpagos, Ecuador. E-mail: png@ecua.net.ec



JAPANESE OIL SPILL - 1997

The New Year began most inauspiciously in Japan with the January 2nd storm-related sinking of the Russian tanker Nakhodka in the Japan Sea resulting in the discharge of 6,270 kl (approximately 1.3 million gallons) of heavy C grade fuel. The New Year's holiday, rough weather, and insufficient preparation and planning resulted in a response that has been heavily criticized for being slow. Oil washed up along 800 km of coastline.

Easily the most disastrous spill ever in Japan, the media coverage was predictably voracious. Less predictable was the tremendous number of volunteers (over 250,000 in all) coming from all over the

country to help with the shoreline cleanup. Pictures of men, women, and children removing the thick oil and water mousse with buckets, scoops, or just gloved hands and passing bucket after bucket of oil along human chains these will be the lasting images of the Nakhodka spill for most people in this country.

The focus of concern during the spill—as reflected in the media and official government response—was its effect on human safety and commerce, especially the impact on fisheries. However, several environmental and research organizations, with Environment Agency cooperation, organized an ad hoc network to determine the extent of injury to seabirds. Harry Carter (Seabird Biologist, USGS, Biological Resources Division), Roger Helm (Chief, Natural Resource Damage Assessment and Oil Spill Response, USFWS), and Scott Newman (DVM, Wildlife Health Center, UC Davis) were invited to come to Japan to assist. Newman advised personnel in oiled wildlife care techniques and facility standards. Carter and Helm developed field-data collection and oiled bird handling protocols and joined Koji Ono (Hokkaido Seabird Center), Mihoko Sato (Japan Alcid Society), and John Fries (University of California) to inspect the spill zone and conduct surveys on eight beaches.

The impact on seabird populations is still being determined, but this much is known. Over 1300 oiled seabirds, most already dead, were recovered from the shoreline. Most of these were Rhinoceros Auklets and Ancient Murrelets, but a few Marbled Murrelet and Japanese Murrelet carcasses were also found. Including birds lost at sea or washed up but unrecovered, the actual number killed is believed to be many times higher.

In July, Japan experienced another high-profile spill. The Diamond Grace, a 147,012 ton tanker ran aground on a shoal in Tokyo Bay and spilled over 1500 kl (aprox. 320,000 gallons) of crude oil (Initial estimates had put this number at over 3 million gallons!). Favorable weather and a rapid, effective response meant that little oil reached the shore. Surveys using the protocols developed during the Nakhodka spill indicate that the immediate effects on seabirds was minimal.

These two incidents have led to efforts in Japan to improve the effectiveness of oil spill response in general, as well as to incorporate wildlife protection more fully

into the official response system. To help achieve this latter goal, WWF-Japan, The Nippon Foundation, the Wildlife Rescue Veterinarian Association of Japan, and the Japan Alcid Society are sponsoring a symposium to be held in Tokyo on December 7, 1997. US speakers will be Captain Joseph Brusseau (Commander, Activities Far East, US Coast Guard), Pete Bontadelli (Administrator, California Office of Oil Spill Prevention and Response - OSPR), Paul Kelly (Science Division, OSPR), Jonna Mazet (Director, California Oiled Wildlife Care Network), and Harry Carter and Scott Newman. Japanese speakers will include representatives from the Environment Agency, the Wild Bird Society of Japan, and the Wildlife Rescue Veterinarian Association of Japan.

For further information regarding this symposium please contact John Fries at jnfries@bio.sci.toho-u.ac.jp

By **John Fries**, Tokyo and **Koji Ono**, Haboro, Hokkaid, Japan

SEABIRD DIE-OFF IN ALASKA

A large number of seabirds have died in several apparently related events in western Alaska this summer. There was a moderate die-off of Common Murres near Nunivak Island in May, an unusual time for murres to die off. Things were quiet for a couple of months. Then murres and puffins washed up in a small area of St. Lawrence Island in late July. At the end of July villages and field stations all over the lower Alaska Peninsula began reporting moribund and dead Black-legged Kittiwakes and shearwaters. During the first and second weeks of August, Short-tailed Shearwater die-off was reported all over Bristol Bay, on the Aleutians as far west as Adak, Nunivak and the Pribilof Islands, and north to St. Lawrence Island and Anadyr (Russia).

The U.S. Fish and Wildlife Service conducted several widely-scattered aerial and beach surveys. Data are still being worked up, but numbers on beaches ranged from tens per mile on the Alaska Peninsula to several hundred per mile in the Bering Sea. Approximately 100 specimens were sent to FWS from villages and agencies all over the die-off area; the best of these are being necrop-

sied at the USGS/BRD National Wildlife Health Laboratory in Wisconsin.

It seems likely that the die-off is a result of abnormal sea conditions. Alaskan waters in summer 1997 were warm and stratified. We hope to learn more as data from fishery and oceanography research in the area are analyzed.

This may be the most widespread die-off documented in Alaska. It is undoubtedly the best-reported, thanks to calls from numerous villagers, fishermen, state field offices, and others. We will do our best to repay the cooperation by getting our conclusions to all areas, even those without regular access to the mass media. We suspect that abnormal oceanographic conditions may persist through the winter.

By *Vivian Mendenhall*, Anchorage, Alaska

PROTECTING ROOSTING CALIFORNIA BROWN PELICANS AT WILLAPA BAY

The North Channel of Willapa Bay, Washington, has been migrating northward over the years, and eroding the shoreline in the Cape Shoalwater area. About 2,000 feet of State Route 105, which runs along the north shore of Willapa Bay, is jeopardized by this erosion. When the Federal Highway Administration and the Washington State Department of Transportation began planning a project to protect Route 105 from erosion, they were unaware that a sandy island in the center of the bay is the most important night roost for endangered Brown Pelicans north of the Farallon Islands. The U.S. Fish & Wildlife Services' (FWS) Oregon Coastal Refuges had conducted aerial surveys along the Oregon and Washington coasts since 1987 and found the mean number of pelicans using the island to be 2,178 birds (range 786 to 5,875).

The highway agencies' environmental assessment found no significant impact under the National Environmental Policy Act for constructing an 85-acre "plug" in the North Channel made of sand-filled geotubes. This would reduce the tidal flow and halt the North Channel's northward migration. Additionally, the highway agencies proposed constructing a large groin and adding sand to the nearby beach to protect the beach from wave action. The sand would be excavated just

south of the project to depths of up to 20 feet.

FWS initially approved a mitigation and monitoring agreement that, among other things, creates breeding habitat for snowy plovers and monitors plover populations for a decade. It did not address Brown Pelicans. With the project scheduled to begin in August, PSG member Roy Lowe was contacted by the U.S. Army Corps of Engineers in late June and asked about the Oregon Coastal Refuges' aerial surveys of pelicans. Roy and PSG member Deborah Jaques informed FWS in Olympia of the importance of Willapa Bay to pelicans and potential impacts associated with the highway project. The refuge's aerial survey data and Deborah's ground observations from her thesis work convinced all project cooperators that pelicans were at risk. Apparently, local, federal and state biologists were unaware of the importance of this island to pelicans, which the Seattle Times described as the best kept secret of Willapa Bay.

FWS initiated an emergency section 7 consultation under the Endangered Species Act for the Brown Pelican. The project cannot proceed until a mitigation and monitoring agreement for pelicans is reached, despite agreement for other species. If the highway agencies proceed with building a "dike," FWS recommends that no dredging or other activities be allowed within a half mile of the roost and that the highway agencies coordinate with FWS to insure that the project design minimizes risk to pelicans. The

design of the channel plug, including sand dredging, should not redirect the flow of the north channel toward the night roost. Brown Pelicans must be monitored for up to ten years, including annual aerial

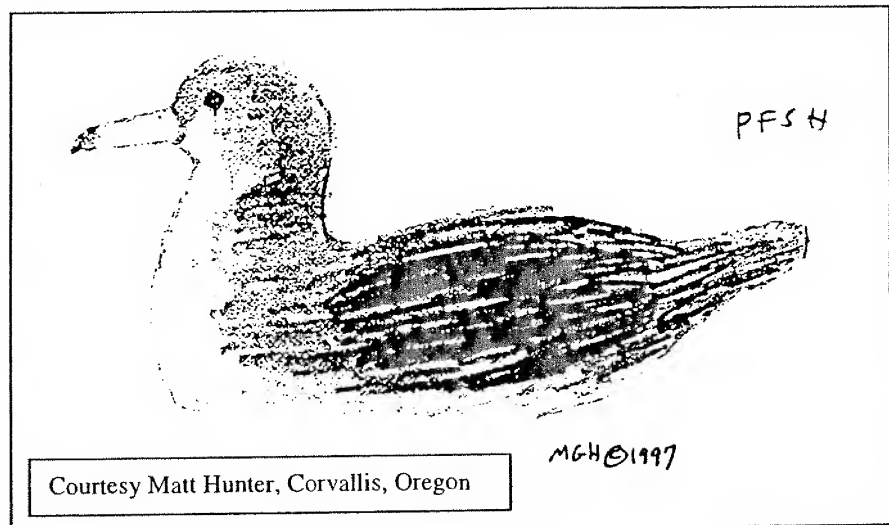
photographs of the roosts; annual bathymetry; roost observations during construction to determine the effectiveness of the buffer zone; and summer monitoring of distribution.

The Corps of Engineers' permit requires a buffer zone, is being issued for all aspects of the project except the "plug." FWS continues working with the highway agencies to modify the "plug" design and to fashion a mitigation plan. PSG members are urged to lend their expertise on this project. For additional information contact Gwill Ging or Fred Sevey, FWS, 510 Desmond Drive S.E., Suite 102, Laacey, WA 98503-1273, (360) 753-9440.

By *Roy W. Lowe*, Newport, Oregon

CONSERVATION OF THE SHORT-TAILED ALBATROSS

On September 22 and 23 a meeting concerning the conservation of the Short-tailed Albatross (*Phoebastria albatrus*) was held in Anchorage, Alaska by the U.S. Fish and Wildlife Service, Endangered Species Office. The "Short-tailed Albatross Population Modeling and Conservation Information Meeting" was a round table meeting for information presentation and discussion of current research, fishery incidental take, National Marine Fishery Service management and observer program, current legal status, and population modeling to determine research needs and conservation actions. Key participants included Dr. Hiroshi Hasegawa of Toho University, Japan who presented his ongoing research and con-



Courtesy Matt Hunter, Corvallis, Oregon

servation activities on Torishima Island, Japan from 1976 to present; Jean Cochran of the University of Minnesota who presented an individual based stochastic model of Dr. Hasegawa's data; Dr. Tony Starfield of the University of Minnesota who facilitated the population modeling discussion; Kim Rivera of the N.M.F.S., Juneau, Alaska who reviewed regulations to avoid seabird bycatch and data of incidental seabird take; and Janey Fadley of the U.S.F.W.S., Endangered Species Office Anchorage who reviewed the current legal status of the Short-tailed Albatross, the endangered species listing process, the U.S.F.W.S involvement, as well as organized the meeting. The meeting generated ideas on additional refinement of the Cochran population model, and future management needs for the conservation of the Short-tailed Albatross. Further information can be obtained from U.S. Fish and Wildlife Service, Ecological Services, Anchorage Field Office. Project Leader Janey Fadley. E-mail: janey_fadley@mail.fws.gov

By Scott Wilbor

EL NIÑO/SOUTHERN OSCILLATION 1997 – INFORMATION

The 1997 El Niño/Southern Oscillation may or may not prove to be the strongest ever recorded. It will certainly be the best-studied, predicted by NOAA in March, and followed by satellites which have monitored SST (sea surface temperature), sea height (Kelvin waves) and rainfall (Outgoing Long wave Radiation).

The ENSO event developed much earlier than usual and it remains unclear whether this event will also end earlier. If it stays around, it may cause massive damage and climatic change.

As of mid September, events linked to the 87 ENSO include a suppressed hurricane season in the Atlantic, warm waters off California, Peru and Alaska, heavy rains in Peru and Chile, die-offs of seabirds in Peru, Alaska, and the Bering Sea, closing of northwest North American shellfish industries because of toxins, drought in Brazil, and major shifts in fish and seabird distributions throughout the Pacific. Not all of these may be directly linked to ENSO. Some of the Alaskan events may be associated with an on-

going drought, the resulting reduced river runoff and a weak Alaska Coastal Current. Comparisons with the 1983 major ENSO will be helpful once the dust settles.

Seabird biologists need to consider what they can do to measure the effects of this event on their study organisms. Outbreaks of mosquitoes, heavy vegetation growth, or flooding can affect reproduction during ENSO events. We know that food shifts during ENSO affect seabirds. Can we now establish the links to food resources and the oceanographic forces that in turn affect them? If birds die, is it because food is scarce? If food is scarce, what has changed in the local marine system? Now might be a good time to team up with local oceanographers and marine biologists to build up a comprehensive picture of local events.

Beyond ENSO, if local mortality of adults occurs, what effect does this have on the breeding population? Do 'floaters' replace nesters, so the population remains stable, but productivity drops? Or do floaters die, so the whole population decreases?

Not all these questions can be asked or answered for each site or seabird, but ENSO offers a major chance to look at the effects of a major perturbation. It also offers a chance to link birds to studies of lower trophic levels. The next chance to do this won't come for at least a decade. Let's get it right now.

Useful Web Sites

Daily sea surface temperature anomalies -

http://www.fnoc.navy.mil/otis/otis_glb1_00_sstanomaly.gif

ENSO teleconnections or what ENSO does in your neighborhood

http://www.dir.ucar.edu/esig/use_tx.html

<http://enso.unl.edu/ndmc/enigma/tab1enso.htm>

<http://www.pmel.noaa.gov/toga-tao/el-nino/impacts.html>

To report ENSO events

<http://darwin.bio.uci.edu/~sustain/ENSO.html>

Pacific data sets and information

<http://naulu.soest.hawaii.edu/index.html>

California data

http://www-mrlg.ucsd.edu/mpeg/tanom_eq.mpg

By David Cameron Duffy, Anchorage, Alaska

THE CIRCUMPOLAR SEABIRD WORKING GROUP

Background

The Program for the Conservation of Arctic Flora and Fauna (CAFF) was established to address the special needs of Arctic species and their habitats in the rapidly developing Arctic region. It forms one of four programs of the Arctic Environmental Protection Strategy which was adopted by Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden, and the United States. The main goals of CAFF are, 1) to conserve Arctic flora and fauna, their diversity and their habitats, 2) to protect the Arctic ecosystems from threats, 3) to improve conservation management laws, regulations, and practices for the Arctic, and 4) to integrate Arctic interests into global conservation fora. The majority of CAFF's Work Plan activities are directed at species and habitat conservation, and attempt to integrate indigenous peoples and their knowledge into CAFF initiatives.

At the inaugural meeting of CAFF in 1992, concern was expressed about the conservation of a number of circumpolar seabird species. During the second meeting CAFF in 1993, a proposal to create a Circumpolar Seabird Working Group (CSWG) presented by the USA was approved. The goal of the CSWG is to promote, facilitate, and coordinate seabird research, management, and conservation activities among the circumpolar countries by improving communication between scientists and managers concerned with northern seabirds.

Recent Activities Of The CSWG

The fourth meeting of the Circumpolar Seabird Working Group occurred April 17-20 in St. Johns, Newfoundland. John Chardine, Canada's CSWG representative, and the Canadian Wildlife Service hosted the meeting. Representatives from six of eight countries signatory to the Declaration on the Protection of the Arctic Environment attended. The meeting agenda included several items related to the conservation, research, and management of Arctic seabirds and seabirds. Here, we briefly review some of these.

Circumpolar Seabird Colony Database

This database will eventually hold all seabird colony data that is available from

circumpolar countries. Initially, the database will only include the colony data for murre. To date, all murre data sets have been received from the countries, and they are now being conformed to the CSWG database structure and coding specifications by John Chardine.

North Atlantic Murre Banding Recoveries Technical Report

Vidar Baken (Norway), is producing a Technical Report summarizing all murre band recoveries. To date, the banding recovery database structure has been completed and the database now includes all band recoveries from all countries except Greenland. A total of 1728 recoveries have been documented. Although completion of the database is awaiting the Greenland recovery data, a CAFF Technical Report entitled "Thick-billed Murre Banding Recoveries in the North Atlantic" is anticipated in the fall of 1997. It will discuss the origin, age, distribution, and timing of band recoveries in thick-billed murre winter areas.

Human Disturbance Of Seabirds In The Arctic

The potential for increased tourism and development in the Arctic may bring increased risks of disturbance at colonies. With this in mind, the CSWG initiated an overview of disturbance issues at Arctic seabird colonies and reviewed existing regulations that are in place in each country to reduce disturbance (lead: John Chardine, Canada). For each country, information was collected relating to disturbance problems, legal protection, and disturbance issues that need to be addressed. This information will be summarized in a Technical Report anticipated in early 1998 entitled, "Human Disturbance of seabird colonies in the Arctic".

Circumpolar Eider Conservation Strategy and Action Plan

While completing its work on the Murre Strategy, CSWG was directed by CAFF to undertake preparation of a Circumpolar Eider Conservation Strategy and Action Plan. This initiative (lead: Jon Bart, USA) reflected global concern for several eider species. The goal of the Strategy was to facilitate circumpolar efforts to conserve, protect and restore eider populations. The Strategy was developed to assist groups within countries to identify eider conservation efforts of greatest importance from a worldwide perspective, and to lead to greater international cooperation in eider conservation

efforts. The Strategy contains Action Items relating to consumptive use, non-consumptive use, commercial activities, habitat protection and enhancement, communication and consultation, and research and monitoring. Each country will decide for itself how to implement the Strategy and guidelines are provided in the document to aid this process. The Eider Strategy was approved in June 1997 at the CAFF ministerial meeting.

Implementation Of The International Murre Conservation Strategy And Action Plan

The conservation and management of murre populations requires international coordination because murre populations migrate across international boundaries. The International Murre Conservation and Action Plan was developed by CSWG (lead: John Chardine, Canada) to enhance conservation of murre populations by coordinating international effort. The Murre Strategy identified several Action Items that were meant to, 1) ensure that consumptive and non-consumptive use of murre is sustainable, 2) minimize the deleterious effects of commercial activities such as shipping and commercial fishing, 3) ensure that murre habitat identification, protection, and enhancement measures are undertaken, 4) implement communications and education programs to ensure public support for murre conservation, 5) facilitate circumpolar coordination of murre research and monitoring programs. At the St. John's meeting, each country representative discussed how each country intended to implement the Action Plans of the Murre Strategy, and the progress that was being made.

Summary

For further information regarding the activities and products of the CSWG, please feel free to contact the authors. The CSWG also produces the Circumpolar Seabird Bulletin, which reports on publications and general activities of the Working Group. The annual bulletin also includes short papers on topics related to Arctic marine birds, and seabird specialists working in the Arctic are encouraged to contribute materials to the bulletin. To receive or to contribute to the CSWG bulletin, please contact Kent Wohl.

By *Grant Gilchrist*, Canadian Wildlife Service, P.O. Box 2970, Yellowknife, Northwest Territories. email: grant.gilchrist@ec.gc.ca, *John Chardine*,

Canadian Wildlife Service, 6 Bruce Street, Mount Pearl, Newfoundland. A1N 4T3. email: john.chardine@ec.gc.ca, and *Kent Wohl*, U.S. Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, Alaska.

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

Thanks to the timely and hard work of Jim Lovvorn, PSG filed extensive comments on the initial approach to updating the North American Waterfowl Management Plan. The plan has not been revised for over a decade. PSG strongly advocated an ecosystem, multi-species, international approach to bird conservation. Among PSG's recommendations were (1) including all shorebirds, seabirds and seaducks in the plan; (2) expanding the geographic scope to include entire ranges of waterbirds; (3) including Important Bird Areas and Partners in Flight plans and agreements; (4) expanding existing joint ventures to include all waterbirds. PSG also suggested establishing a Seaduck Joint Venture. We explained our concerns about apparent declining populations of eiders, Harlequin Ducks, scoters and Oldsquaws. The most serious obstacle to effective conservation action is the lack of knowledge about the breeding, migrating, and wintering biology of seaducks. Coordinated studies of their population processes and habitat relations throughout the annual cycle are needed to identify causes of population declines. In particular, we need research on habitats in the non-breeding period for these species.

TROPICAL SEABIRD CONSERVATION FORUM

At the Pacific Seabird Group Annual Meeting in Portland, a number of members interested in tropical seabird conservation (tropical and subtropical areas of the Pacific) met to discuss how PSG and its individual members can become involved and raise awareness of tropical seabird conservation. This initial discussion resulted in many good ideas for how PSG can have more of a presence in these areas and also how members can contribute in various projects. A majority of individuals agreed that an open forum in

Pacific Seabirds would be a method for individuals to highlight significant research or conservation work in-progress, identify specific conservation needs, and also serve as a site for further discussion and action by PSG. Perhaps most importantly, many people agreed that simply identifying current needs or actions with a contact person would be the best method for individual members to become involved. Scott Johnston, PSG's Regional Representative for the Pacific Rim, has agreed to help develop the forum and serve as a clearinghouse for ideas, suggestions, and items for inclusion in the forum. Please send any comments or submission to Scott (addresses on the Executive Council page in back of PS).

The following items are the results of the initial discussion on tropical seabird conservation:

1. Methods for PSG involvement in tropical seabird conservation.

- Members identify specific conservation issues and address to write for more information or action.
- Members draft letters supporting conservation actions, research, or legislation.
- Members publish specific projects for funding or assistance within the forum.
- Publish a home page devoted to tropical seabird conservation.
- Mentoring of tropical biologists (requires identification of people seeking mentoring).
- Sponsor a membership to Pacific Seabirds for someone in the Pacific (requires Identification of people seeking membership).
- "Adopt-an-Island": PSG members adopt an island and determine threats, data gaps, history, resources, etc.. Publish in PS to raise awareness and promote specific conservation tasks.

2. Specific Topics

Christmas Island

- potential for PSG as clearinghouse for communication with industries to promote conservation.
- agency people need more equipment such as boat motors.
- potential for graduate student projects.
- school education is possible: Phoenix petrel is on national stamp.

•worksheets or coloring books could be used for education.

•draft letter to IUCN re: conservation needs and opportunities.

•has own home page - could assist with developing further.

•Blue Water Cruising Association - publication that could reach sailors traveling in the tropical Pacific to encourage conservation action.

•Develop methods for reaching long-line fisheries in order to reduce conflicts with seabirds.

Clipperton Island

•many island uninhabited, but development is potential issue.

•PSG could bring up issues of conservation value in press or other media.

•potential World Heritage Site.

•contact with French biologists is necessary.

•BBC is looking for sites to do documentary.

Galapagos Islands

•requires monetary and international support for conservation efforts.

•PSG as clearinghouse for issues of importance for Galapagos.

•Darwin Research Station has home page.

If you are interested in more information on any of these topics and would like to be in contact with a lead person, please contact Scott Johnston. If you have additional information or would like to take the lead on any of these issues, please volunteer. Thank you for your interest in tropical seabird conservation. Look for the Tropical Seabird Conservation Forum in upcoming issues of PS.

By *Scott Johnston*, Washington, DC

GIANT SEAGULLS ATTACK WHALES

[Conservation education has yet to reach many individuals, witness the following news item.]

Buenos Aires, Argentina - Giant seagulls, swollen beyond their normal size by a diet of rubbish in southern Argentina, have taken to swooping down on top of whales and pecking pieces of their flesh, a whale-watching group said on Thursday.

The whales of the Peninsula Valdes "are being savagely attacked by seagulls, which cause wounds in the animals' skin up to seven centimeters (three inches) deep," whale-watcher Carlos Bottazzi told the state-run Telam news agency.

"The whales feel such intense pain that they twist around to try to escape from the birds and swim underwater," Bottazzi, of the "Green Fleet" of whale-watching boats, said.

The seagulls' behavior has changed due to years on a diet of rubbish and fish dumped by local fleets, which has allowed them to grow bigger than ever before.

"That diet has made the seagulls astonishingly big and heavy. And if you add that to the bird's quick wits and strength, you have a dangerous customer," Bottazzi said.

He said the seagulls also attack whale calves.

Peninsula Valdes is a world-famous spot for observing Right whales, which swim close to shore to give birth to their calves. Tourists who come from around the world to visit the whales on boat trips.

OCEANOGRAPHIC SAMPLING OFF NEWPORT, OREGON

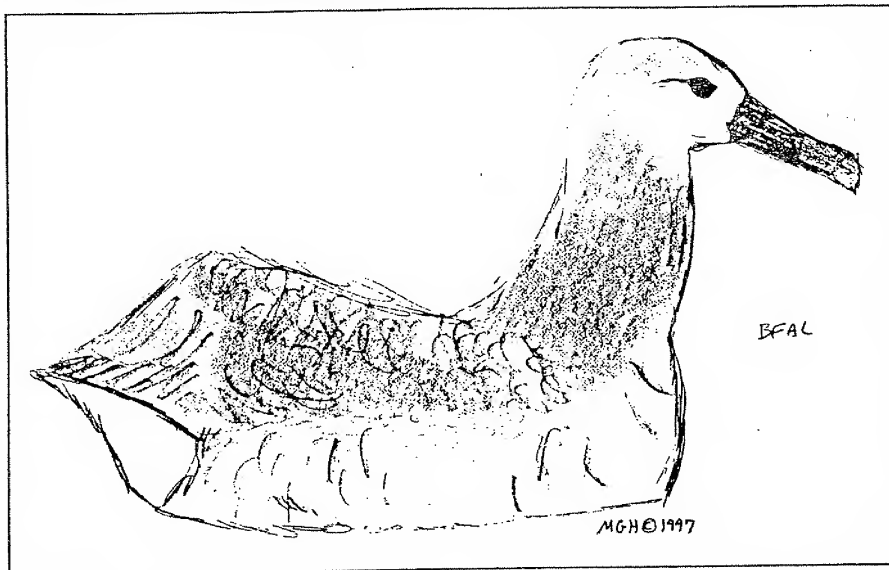
Bill Petersen of the National Marine Fisheries Service is conducting bi-monthly oceanographic sampling off Newport, Oregon. His sampling is being conducted along the Newport Hydrographic Line (44°40'N) at stations 1, 3, 5, 10 and 15 miles from shore. Bill and others sampled this same hydrographic line for zooplankton and larval fish during the 1970s and others from the OSU Oceanography Department monitored here in the 1960's and 1970's both with CTD (conductivity, temperature, depth) surveys as well as with current meter moorings. Thus there is a fairly large data base on hydrography, currents, plankton and larval fish for the 1970's. Very little sampling has been done off Oregon since the late 1970's. Bill has resumed sampling along this line in order to compare ocean conditions at present to those which existed in the past and is particularly interested in learning how (or if) the coastal pelagic ecosystem has changed as a result of the climate shift of 1977. Bill is also interested in learning to what degree possible changes in ocean productivity ex-

plain the continuing decline in survival of coho salmon. This work began in May 1996 and will continue for at least three more years.

At each station a profile of conductivity and temperature with depth is recorded with a Seabird SBE-19 CTD, a secchi depth reading is made, water samples for chlorophyll analysis are collected from 0 and 10 m, a vertical haul with a 1/2 m mouth diameter, 200 um mesh zooplankton net is made from the bottom to the surface, and a double oblique tow with a 1-m diameter, 333 um mesh net over the upper 20 m for fish eggs, fish larvae and euphausiids is also made. All work is accomplished during the daytime from a small 37' boat. In the lab, a complete work-up of the zooplankton samples is made and everything is counted to species and for the common species, to developmental stage.

Currently, not enough data analysis has been done to draw too many conclusions. However, it is clear that the past two summers (1996 and 1997) have both been "anomalous" compared to the 1970's in that the water is warmer, upwelling has begun later and ended sooner. Since the upwelling season is reduced in length, you would expect on average that the water would be warmer and last summer upwelling occurred for 9 weeks and this summer 4 weeks. Another intriguing aspect about the upwelling in recent years is that when it does occur, it does not seem to be as intense. During the 1970's they commonly observed water of 8.0-8.5° centigrade (C) at the surface nearshore. Bill has not seen water that cold during the present sampling with the coldest recorded so far at 9.3° C. Also, the copepod (*Acartia clausii*) which was very abundant at the most nearshore stations (1 and 3 miles) has been virtually nonexistent. Abundance of more offshore species do not seem to be all that different.

The only clear difference is with the length of the upwelling season. This can be analyzed further by looking at the historical wind data from Newport's south jetty but this has not been done yet. Bill is currently gathering surface temperature data from the 1970's and 1980's in an attempt to develop a climatology. There are



some good data from the weather buoys (Buoy 46050 and 46040) but neither has a very long time series. Buoy 46040 was off Depoe Bay from about 1987-1991 and buoy 46050 was off Newport from 1990-1996. Once analyzed, they'll have a time series of approximately 9 years length that should be useful for looking at the length of the upwelling season. Bill's working hypothesis at this point is that low productivity and "poor ocean conditions" may be due solely to a shorter upwelling season.

STATUS OF SEABIRD/ GILLNET ISSUE IN WASHINGTON

A significant step was taken this year when the Washington Fish and Wildlife Commission implemented several regulations designed to reduce seabird mortality in the non-tribal sockeye fishery in north Puget Sound. These measures included eliminating gillnet fishing at night and during the morning change of light in 1997, requiring a strip of visible mesh 20 meshes deep in the upper part of gillnets in 1998, and authorizing the Director of Washington Department of Fish and Wildlife to consider seabird and fish abundance when scheduling fishing openers. These measures are based on rec-

ommendations from the study on modified gillnet gear conducted by Ed Melvin of Washington Sea Grant. In addition, monitoring of seabird numbers during the fishery has been implemented by Washington Department of Fish and Wildlife to enable seabird abundance to be factored into fisheries management decisions. Two types of aerial surveys, one intensive and one abbreviated, are being conducted for comparative purposes. Implementation of these measures will provide a significant reduction in seabird entanglement, although additional measures to further reduce entanglement will be required.

Because of the current El Nino conditions on the outer coast of the Pacific Northwest, there was a great deal of concern about a large influx of murres into Puget Sound. Because conservation measures were not fully implemented in 1997, significant conflicts with the gillnet fishery were possible. Fortunately, murres in large numbers did not materialize. Fishing effort was also lower than anticipated because the majority of the large sockeye salmon run returning to the Fraser River did not pass through U.S. waters.

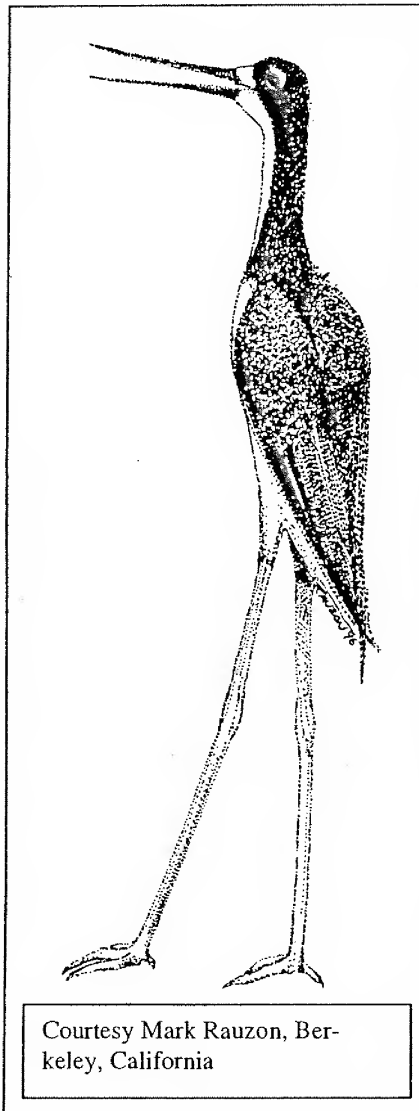
By **John Grettenberger**, U.S Fish and Wildlife Service and **David Nysewander**, Washington Department of Fish and Wildlife.

JAPAN SEABIRD CONSERVATION

Report Of The Japan Seabird Conservation Committee - Fall 1997

The New Year began most inauspiciously in Japan with the January 2nd storm-related sinking of the Russian tanker *Nakhodka* in the Japan Sea resulting in the discharge of 6,270 kl (approximately 1.3 million gallons) of heavy C grade fuel. The New Year's holiday, rough weather, and insufficient preparation and planning resulted in a response that has been heavily criticized for being slow. Oil washed up along 800 km of coastline. Easily the most disastrous spill ever in Japan, the media coverage was predictably voracious. Less predictable was the tremendous number of volunteers (over 250,000 in all) coming from all over the country to help with the shoreline cleanup. Pictures of men, women, and children removing the thick oil and water mousse with buckets, scoops, or just gloved hands and passing bucket after bucket of oil along human chains these will be the lasting images of the *Nakhodka* spill for most people in this country.

The focus of concern during the spill—as reflected in the media and official government response—was its effect on human safety and commerce, especially the impact on fisheries. However, several environmental and research organizations, with Environment Agency cooperation, organized an ad hoc network to determine the extent of injury to seabirds. Harry Carter (Seabird Biologist, USGS, Biological Resources Division), Roger Helm (Chief, Natural Resource Damage Assessment and Oil Spill Response, USFWS), and Scott Newman (DVM, Wildlife Health Center, UC Davis) were invited to come to Japan to assist. Newman advised personnel in oiled wildlife care techniques and facility standards. Carter and Helm developed field-data collection and oiled bird handling protocols and joined Koji Ono (Hokkaido Seabird Center), Mihoko Sato (Japan Alcid Society), and John Fries (University of California) to inspect the spill zone and conduct surveys on eight



Courtesy Mark Rauzon, Berkeley, California

beaches.

The impact on seabird populations is still being determined, but this much is known. Over 1300 oiled seabirds, most already dead, were recovered from the shoreline. Most of these were Rhinoceros Auklets and Ancient Murrelets, but a few Marbled Murrelet and Japanese Murrelet carcasses were also found. Including birds lost at sea or washed up but unrecovered, the actual number killed is believed to be many times higher.

In July, Japan experienced another high-profile spill. The *Diamond Grace*, a 147,012 ton tanker ran aground on a shoal in Tokyo Bay and spilled over 1500 kl (approx. 320,000 gallons) of crude oil (Initial estimates had put this number at over 3 million gallons!!). Favorable weather

and a rapid, effective response meant that little oil reached the shore. Surveys using the protocols developed during the *Nakhodka* spill indicate that the immediate effects on seabirds was minimal.

These two incidents have led to efforts in Japan to improve the effectiveness of oil spill response in general, as well as to incorporate wildlife protection more fully into the official response system. To help achieve this latter goal, WWF-Japan, The Nippon Foundation, the Wildlife Rescue Veterinarian Association of Japan, and the Japan Alcid Society are sponsoring a symposium to be held in Tokyo on December 7, 1997. US speakers will be Captain Joseph Brusseu (Commander, Activities Far East, US Coast Guard), Pete Bontadelli (Administrator, California Office of Oil Spill Prevention and Response - OSPR), Paul Kelly (Science Division, OSPR), Jonna Mazet (Director, California Oiled Wildlife Care Network), and Harry Carter and Scott Newman. Japanese speakers will include representatives from the Environment Agency, the Wild Bird Society of Japan, and the Wildlife Rescue Veterinarian Association of Japan. For further information regarding this symposium please contact John Fries at jnfries@bio.sci.toho-u.ac.jp **John**

By **Fries**, Tokyo and **Koji Ono**, Haboro, Hokkaido

MARBLED MURRELET CONSERVATION

Summary Of Activities Of The Marbled Murrelet Technical Committee For 1997.

This is the second year I have acted as your Marbled Murrelet Technical Committee (MMTC) coordinator. The MMTC had a busy and productive year in 1996, and although 1997 has not been as busy, we still have some important items to accomplish for this years agenda and significant issues to be addressed. I would like to do a better job of organizing and keeping track of the various subcommittees, names of members of the committees, the tasks that they are working on, and timelines for completing their work. I

would appreciate the help of everyone involved in accomplishing these goals. I have enjoyed working for you and PSG over the last two years. The following is a summary of our activities for 1997.

Communications

4/24/97 - A letter updating several aspects of the Pacific Seabird Group Marbled Murrelet Inland Survey Protocol was sent to all interested parties. The purpose of the letter was to clarify some aspects of the protocol including the number of survey visits to be conducted at a site to establish absence, presence, or occupancy. The letter also discusses the definition of suitable habitat, the interpretation of circling behavior and changes to the survey form. Copies of the letter are available from C.J. Ralph, USFS, 1700 Bayview Drive, Arcata, CA. 95521.

10/9/97 - Many Pacific Seabird Group members have voiced their concern over the last year and during the last PSG meeting that changes and updates to the Marbled Murrelet Inland Survey Protocol (Ralph et al. 1994) are often made without prior knowledge or a chance for peer review by many of the members of the Marbled Murrelet Technical Committee. To help solve this problem the MMTC has planned a meeting to discuss developing a more structured process that would allow changes and updates to be made to the Marbled Murrelet Inland Survey Protocol with the peer review and participation of a broader audience of technical committee members. If a process can be developed that all participants are satisfied with, it may be useful to consider implementing it for other communications that the MMTC produces. If time allows, we would also like to discuss developing a final version of the survey protocol that would be peer reviewed and published in a scientific journal. A notice of the meeting was sent to all current members of the MMTC. If you are not able to attend but would like to comment, please send your comments to Thomas Hamer. The meeting was held in Portland, Oregon on Thursday, October 9th, 1997.

Marbled Murrelet Recovery Team

The USFWS Marbled Murrelet Recovery Team has completed incorporating public comment and making final edits to the Marbled Murrelet Recovery Plan. Most of the final edits were made at a meeting in February 1997. The final recovery plan has been sent to the printer

for publication. At the last recovery meeting, the team also reviewed the study design and results of the Six Rivers National Forest survey effort to determine if murrelets were absent from regions of this forest. Lee Web of the Siskiyou National Forest made a presentation on similar survey efforts they have been conducting in southwest Oregon. Steve Courtney of SEI made a presentation on the plans to conduct a population viability model for marbled murrelets in northern California to support a Habitat Conservation Plan for the Pacific Lumber Company.

Annual Pacific Seabird Group Meeting - 1996

Several sub-committees of the MMTC met during the last Pacific Seabird Group meeting held in Portland, Oregon. These committees included the Inland Survey Protocol Sub-committee, Marine Survey Protocol Subcommittee, Education and Research Priorities Subcommittee, and the Inland Habitat Subcommittee. Kathy Kuletz would like to organize a nest behavior subcommittee if people are interested. These committees will meet again at the next annual PSG meeting in Monterey. If you are interested in joining and supporting one of these subcommittees please sign up during the MMTC general meeting to be held on January 21st.

Conservation Issues

Mortality of marbled murrelets in the Puget Sound due to entanglement in gill-nets still remains a conservation issue. To help bring the issue to light and learn more about where the issue stands and what is being done about the problem, the MMTC would like to invite several speakers to the next annual PSG meeting to update us on the issue, provide their viewpoints on the severity of the problem, provide recommendations on how to address the issue, and discuss current research and conservation efforts to grapple with the matter. Look in the 1998 MMTC agenda at the meeting in Monterey for the times of these presentations.

The Long-billed Murrelet—A New Species

It is now official! The Asiatic form of the Marbled Murrelet (*Brachyramphus marmoratus perdix*) was declared a distinct species by the American Ornithologists' Union (AOU) in July (Auk 114:544-545). Its new name is the Long-billed Murrelet (*Brachyramphus perdix*). Although long considered separate species, the North American form (*B. m.*

marmoratus) and the Asiatic form of the Marbled Murrelet were considered conspecific by the AOU in 1957. However, recent molecular genetic evidence presented by Friesen et al. (1944, 1996) and Piatt et al. (1994) demonstrated that these subspecies should again be recognized at the species level.

International Conservation

In summer of 1996, surveys for the Long-billed Murrelet (formerly the Asiatic form of the Marbled Murrelet) were conducted on the island of Hokkaido in northern Japan in an attempt to locate potential breeding sites (see page 62 for a summary of this research). While no individuals were detected at inland sites during the 1996 surveys, many murrelets were sighted in the Sea of Okhotsk off the Shiretoko Peninsula in northeastern Hokkaido during offshore surveys in summer 1997 by Dr. Yoshihiro Fukuda. S. Kim Nelson and Tom Hamer, along with Dr. Fukuda, Dr. Koji Ono, John Fries, and Harry Carter, are currently looking for funding to continue the offshore surveys in 1998 and inland surveys in later years in a continued effort to determine the breeding status of the Long-billed Murrelet in Japan.

PSG TESTIFIES TO ECOSYSTEM MANAGEMENT PANEL ON MARINE FISHERIES

When Congress recently reauthorized the Magnuson-Stevens Fishery Conservation and Management Act, it directed the National Marine Fisheries Service (NMFS) to establish an Ecosystem Principles Advisory Panel. The panel is to study how marine ecosystem research is conducted, and to advise how the results of that research should be used to improve management of marine resources. Panel members include government and academic marine scientists, representatives of fishing industry, conservation organizations and regional fishery management councils. While PSG's nominee was not appointed to this panel, PSG provided written and oral testimony at the panel's first meeting in Washington, D.C., in September 1997 (see p. 58).

An ecosystem management approach encourages NMFS to view fisheries resources as part of an interconnected community of living things, including humans, and the physical environment

with which they interact. Many of the complex interactions in marine ecosystems are poorly understood, and require research.

The panel will advise NMFS through a report to Congress due October 1998, which will include: (1) an analysis of the extent to which ecosystem principles are being applied in fishery conservation and management activities, including; and (2) proposed actions that NMFS and Congress should undertake to expand the application of ecosystem principles in fishery conservation and management.

CALL FOR NOMINATIONS FOR PSG AWARDS AND EX- ECUTIVE COUNCIL MEM- BERS

Please send any nominations for the Lifetime Achievement or Special Achievement Awards to Bill Everett (see address on inside of back cover). Also please send any nominations for the Executive Council, including Chair-elect, Secretary, Treasurer, and Regional Representatives to Pat Baird (see address on inside of back cover).

MANUSCRIPTS NEEDED FOR PACIFIC SEABIRDS

Pacific Seabirds is available for the publication of a variety of items that can appear in technical Articles and Review Articles, the Forum, Book Reviews, Conservation News and the Bulletin Board. Items should be submitted to the appropriate editors (see inside front cover). We encourage the authors of posters and oral papers presented at the Pacific Seabird Group annual meeting to consider Pacific Seabirds as an appropriate outlet for the publication of their studies. Posters may be particularly suitable to appear as short technical Articles. Of course, re-

sults of studies not reported at the annual meeting are certainly welcome, from anywhere in the world.

The topics of Review Articles can be conservation, management or scientific in nature. Review Articles, as the title implies, are designed to provide in-depth reviews of topics relating to the conservation and biology of seabirds and their environment. Potential authors of Review Articles should contact the Editor for Technical Articles, Bill Sydeman, prior to beginning a review.

All submissions that appear as Articles or Review Articles require the successful completion of a peer review process and required revisions.

Help us continue to build Pacific Seabirds by submitting manuscripts; they are needed and appreciated.

The Editors

EXXON VALDEZ OIL SPILL RESTORATION FINAL RE- PORT

FIRST PSG TECHNICAL PUBLICATION NOW AVAIL- ABLE

The Exxon Valdez Oil Spill, Restoration Project Final Report, of the Exxon Valdez Oil Spill Seabird Restoration Workshop, has been completed and submitted. Requests for copies of the report should be directed to the Exxon Valdez Oil Spill Office in Anchorage, Alaska (1-800-283-7745). Ken Warheit, Craig Harrison and George Divoky edited the Final Report.

In the near future the report will be available on the PSG web site, where users will be able to download copies.

This is the first of the Pacific Seabird Group Technical Publications, a new PSG series designed for the publication of a variety of documents necessarily to long for publication in Pacific Seabirds. The

series is available for publishing reports relating to the biology and conservation of marine birds and their environment, throughout the world. Publications will appear as hard copy, or electronic form on the PSG web site, and in both formats as appropriate. This will be the first step in electronic publishing by the Pacific Seabird Group.

MEETING ABSTRACTS ON THE PSG WEB SITE

The abstracts of papers and posters to be presented at the 25th annual meeting of the Pacific Seabird Group in Monterey, California, January 1998, will soon be available on the PSG web site. There they can be viewed in their entirety or downloaded.

AUCTION ITEMS NEEDED FOR PSG'S 25TH ANNUAL MEETING

PSG will again hold a silent auction at the Annual Meeting. Please help PSG raise money for the Endowment Fund by sending donations for the auction to Elizabeth McClaren (see address on inside of back cover).

HISTORY OF PSG

At our 25th Annual Meeting a pictorial history of PSG will be presented in the lobby of the Monterey Convention Center. Please help us make this history a complete and memorable experience by sending your ideas, photographs, and memories or details of PSG meetings, members, post-meeting field trips, and field research to S. Kim Nelson (see address on inside of back cover).

1998 ANNUAL MEETING IN MONTEREY, CALIFORNIA

PACIFIC SEABIRD GROUP



TWENTY-FIFTH ANNUAL MEETING MONTEREY, CALIFORNIA 21-25 JANUARY 1998

The 1998 Annual Meeting of the Pacific Seabird Group will be held at the Monterey Conference Center in downtown Monterey, California from 21-25 January 1998. The meeting will include special events to celebrate the 25th anniversary of the Pacific Seabird Group. As part of the celebration a symposium is being developed entitled *Seabirds in a changing ocean: advances in seabird science*. The symposium will include plenary and review papers on this theme. A meeting announcement, with symposium speakers, registration materials and a call for papers, will be mailed in September 1997. Deadlines for abstracts were due shortly thereafter. Registration for the meeting is ongoing.

If you have any questions or would like to assist with the planning please contact:

Local Committee Chair:

Mike Parker, USFWS, San Francisco Bay National Wildlife Refuge Complex, Post Office Box 524, Newark, California 94560. E-mail: mike_parker@mail.fws.gov

Program Chair:

Alan E. Burger, Department of Biology, University of Victoria, Victoria, BC, Canada V8W 3N5. e-mail: aburger@uvm.uvic.ca

Symposium Chair:

David C. Duffy, Alaska Natural Heritage Program, University of Alaska, Anchorage, 707 A Street, Anchorage, Alaska 99501. e-mail: afdcd1@uaa.alaska.edu

TENTATIVE Daily Schedule

Wednesday 21 January

Preconference meetings - open to all
Executive Council
Committee Meetings - to be announced
Welcome reception in the evening

Thursday 22 January

Plenary Session in morning
Paper Session in afternoon
Poster Session/evening reception

Friday 23 January

Paper sessions morning and afternoon
Reception at Monterey Bay Aquarium

Saturday 24 January

Paper sessions morning
Committee meetings in afternoon
Executive Council
Conservation Committee
Business meeting
Other committee meeting as needed
Evening banquet

Sunday 25 January

Field Trips - to be announced

CONSULT THE PSG WEB SITE FOR THE MEETING TIME SCHEDULE
PAPER AND POSTER SESSIONS, COMMITTEE MEETINGS
SOCIAL EVENTS
PAPER ABSTRACTS

REGIONAL REPORTS

RUSSIA-ALASKA

The Cook Inlet Seabird and Forage Fish Study (CISeaFFS ["Sisyphus"]), led by **John Piatt** (BRD/USGS, Anchorage) in collaboration with the EVOS Trustees, APEX (**Dave Duffy**), USFWS (**Vern Byrd**, **David Irons**), ADF&G, UAF and MMS has completed its third year of study on seabird responses to fluctuating prey densities. In 1997, CISeaFFS involved more than 40 field personnel and hands-on collaborators. We continued to census and measure breeding, behavioral, and foraging responses of Common Murres, Black-legged Kittiwakes, Tufted and Horned puffins, cormorants and Glaucous-winged Gulls at three markedly different colonies in lower Cook Inlet: Gull Island, Kachemak Bay (increasing populations, studies by **Stephani Zador**, **April Nielsen**, **Mike Shultz**, **Jenny Wetzel**); Chisik Island (decreasing populations, **Ann Harding** [Sheffield U.], **Dave Black**, **Greg Hoffman**), and the Barren Islands (stable populations, **Art Kettle**, **Dave Roseneau**, **Margi Blanding**, and others, Alaska Maritime NWR). In 1997, we also initiated banding of adult murres and kittiwakes on Gull and Chisik islands to measure annual survival, radio telemetry to assess foraging behavior and adult survival (**Tom van Pelt**), and controlled experiments at colonies and in the lab to examine stress (corticosteroid) responses of murres, kittiwakes and puffins to differing food regimes (**Sasha Kitaysky**, **John Wingfield**, U. Washington). Adult murres, puffins and kittiwakes were also collected for continuing diet studies (with **Alan Springer** [UAF]), stable isotope studies (**Keith Hobson** [CWS]), and population genetics (**Brad Congdon**, **Vicki Friesen**, Queen's U.) At several colonies in Kachemak Bay, **Mike Litzow**, **Brian Duggin** [OSU], **Sadie Wright** [UAF] and **Brian Smith** [OSU] studied Pigeon Guillemot breeding biology, diets and foraging behavior; and collected blood for studies of oil exposure (in collaboration with **Dave McGuire**, BRD/UAF). **Marc Romano** (OSU) and **Jennifer Pierson** (OSU) completed a second year of lab studies in Kachemak Bay on kittiwake and puffin chick growth on different food regimes (in collaboration with **Dan Roby** [BRD/OSU]. On the

at-sea side of CISeaFFS, we conducted our third year of hydroacoustic surveys around each colony (**Suzann Speckman**), mid-water trawling for schooling fish (**Alissa Abookire**, **Jared Figurski**), and nearshore seining of forage fish with a particular emphasis on sandlance (**Martin Robards** [MUN], in collaboration with **George Rose** [MUN]). In 1997 we added phyto- and zooplankton surveys in Kachemak Bay (in collaboration with **Peter McRoy**, UAF). We continued to characterize the local oceanography with continuous temperature loggers, CTD profiles and AVHRR satellite imagery (**Gary Drew**). Analysis of historical forage fish data in Cook Inlet and the Gulf of Alaska continue in collaboration with **Paul Anderson** (NMFS), **Bill Bechtol** (ADF&G) and **Jim Blackburne** (ADF&G). Additional field assistance was provided by **Greg Snedgen** (AMNWR), **Roman Kitaysky**, and **Lilly Goodman**. CISeaFFS is scheduled (and more importantly, funded) to continue for two more field seasons.

Bob Day of ABR reports a second year of research (with **Deb Nigro** of ABR) on status and ecology of Kittlitz's and Marbled murrelets in glaciated fjords of Prince William Sound and on-going radar-based research on migration of eiders past Point Barrow (with USFWS and the North Slope Borough).

Dee Boersma continued her work on reproductive success of murres in the Barren Islands by deploying cameras that took pictures of the birds every 10 minutes during daylight hours from mid-June until Mid-September. This work is a continuation of research examining the impacts of the Exxon Valdez oil spill on murres. Boersma and **Julia Parrish** have a paper in press in *Auk* on their work on the response of Fork-tailed Storm-petrels to environmental variability that should come out in the January 1998 issue.

Scott Hatch and **Charla Sterne** continue to work on development of the Pacific Seabird Monitoring Database, with cooperation this year from PRBO, Simon Fraser University, various colleagues in Japan and Canada, and several offices of the U.S. Fish and Wildlife Service and National Park Service.

Lisa Haggblom reports that Togiak NWR staff monitored population and productivity of Black-legged Kittiwakes,

Common Murres and Pelagic Cormorants at Cape Pierce, AK during May - August, populations and productivity of Black-legged Kittiwakes and Common Murres at Cape Newenham during the same period, and collected Black-legged Kittiwakes for diet studies at Cape Pierce in 1997.

Leslie Slater and a field crew of **Rebecca Howard**, **Shelly Britton**, **Jennifer Wang** conducted population and productivity studies at St. Lazaria Island (SE Alaska) on Fork-tailed and Leach's storm-petrels, Pelagic Cormorants, Common and Thick-billed murres, Rhinoceros Auklets, and Tufted Puffins. This is their fourth full field season at this location. Reports summarizing results may be obtained from **Leslie Slater**, Alaska Maritime National Wildlife Refuge 2355 Kachemak Bay Drive, Homer, AK 99603-8021. Leslie was able to recheck periodically visited plots at Forrester Island as well. She also coordinated EVOS Apex work at Chisik and Duck islands, Cook Inlet.

Dave Roseneau, **Arthur Kettle**, **Margi Blanding**, **Stephanie Zuniga** and others continued the EVOS Apex research in the Barren Islands, and they also monitored murre populations in the Barrens. **Dave Roseneau** and **Martin Robards** continued the EVOS study involving the use of predatory fish to sample relative abundance of forage fish in lower Cook Inlet.

Dave Roseneau, **Mary Chance**, and **Peter Chance** continued the annual monitoring program for seabirds at Cape Lisburne, a project sponsored by Minerals Management Service.

Art Sowls continued to lead annual monitoring programs for seabirds in the Pribilofs with camp leaders **Rachael Schindler** at St. George and **Terry Carten** at St. Paul. He also coordinated a project conducted by **Mike Cavin** to collect halibut stomachs at St. Paul to describe relative abundance of forage fish.

Art Sowls, **Tony DeGange**, **Jay Nelson**, and **Mike Schwitters** conducted seabird monitoring at Hall and St. Matthew Islands, a periodic monitoring site. **Art Sowls** continued to work on the Pribilof rat prevention project and he and **Tony DeGange** made progress in implementing a program to respond to ship wrecks that could introduce rats on islands.

Steve Ebbert led a project to restore seabird nesting habitat on Semisopochnoi

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and Kagalaska islands by removing introduced arctic foxes. He and **Greg Thomson** conducted murre and auklet surveys on Semisopochnoi as well.

Jeff Williams coordinated annual seabird monitoring projects at Kasatochi Island, where **Lisa Scharf** was the camp leader, and at Buldir, where **Mary Orthworth** was camp leader. **Susan Woodward**, camp leader, continued the annual seabird monitoring program at Aiktak Island.

Vernon Byrd, **Jeff Williams**, and **Don Dragoo** participated in a cooperative seabird, marine mammal, and oceanography investigation near the Pribilofs. They also conducted seabirds surveys at Bogoslof and Walrus islands. **Vernon Byrd** and **Jeff Williams** have conducted seabird surveys at Koniui and Ulak islands. **Ed Murphy** and **O'Brien Hollow** counted Common Murres and Black-legged Kittiwakes and continued the annual monitoring of breeding performance of murres, kittiwakes and Pelagic Cormorants at Bluff.

Becky Howard and **Joel Cooper** completed entering historic data for most of the major seabird monitoring sites on the refuge in the Pacific Seabird Monitoring Database.

Vernon Byrd and **Don Dragoo** edited the first annual report summarizing seabird monitoring data for 1996 on the Alaska Maritime NWR (with information also from Togiak NWR and several non-refuge sites). This report is available from the refuge office (2355 Kachemak Bay Drive, Suite 101, Homer, AK 99603).

From **Tony DeGange** comes news of a report: DeGange, A.R. 1996. A conservation assessment for the Marbled Murrelet in southeast Alaska. USDA Forest Service, Pacific Northwest Research Station (PNW). General Technical Report PNW-GTR-388. 72pp., available through: U.S. Forest Service, PNW, Research Information Services/Publication Requests P.O. Box 3890, Portland, Oregon, and Seim, S. G., A. N. Golovkin, M. J. Wilson, K. D. Wohl. 1997. Alaska-Russian Far East seabird bibliography. U.S. Fish and Wildlife Service, Nongame Migratory Bird Management, 1011 East Tudor Road, Anchorage AK 99503. 289 pp. Also available as Pro-Cite computerized database. Contains 2,836 citations, including unpublished material.

Bill Ostrand, USFWS, is conducting an at sea foraging study in Prince William Sound, Alaska, as a component of an ecosystem study, APEX, supported by the

Exxon Valdez Oil Spill Trustee Council. Short-term goals are to compare forage fish biomass to seabird abundance and productivity. Long-term objectives include developing seabird and forage-fish habitat selection models and the mapping of important seabird foraging habitat within Prince William Sound. Reports are currently available and publications are anticipated within the next year. Contact: **William D. Ostrand**, USFWS, 1011 E. Tudor Rd, Anchorage, AK 99503.

Black Guillemot breeding phenology and adult survival were monitored at Cooper Island in the western Beaufort Sea by **George Divoky** (UAF). The colony is continuing to decline - down to 110 pairs from its high of 225 pairs in 1989. A relatively cool May and June resulted in the latest clutch initiation this decade.

Jane Fadley, **Jean Cochrane**, **Vivian Mendenhall**, **Kent Wohl** (all USFWS), and **Hiroshi Hasegawa** (Toho University) met on 22 - 23 September in Anchorage to discuss population modelling for the Short-tailed Albatross and to brainstorm on conservation needs.

Kathy Kuletz and **Steve Kendall** resumed the EVOS restoration study of Marbled Murrelet productivity in Prince William Sound. Record numbers of adult murrelets were encountered, but productivity was roughly equivalent, or lower, than in 1994-1996. In addition to surveys at sea to gauge murrelet productivity, they quantified murrelet diet and sampled forage fishes. They found spatial and temporal differences in prey species used by murrelets (mainly herring and sand lance) that may be related to juvenile densities. The murrelet data will be compared to independent measures of forage fish abundance as part of the APEX ecosystem study.

Information about the murrelet productivity index used in Prince William Sound can be obtained from: Kuletz, K.J., S.J. Kendall and D.A. Nigro. 1997. Relative abundance of adult and juvenile Marbled Murrelets in Prince William Sound, Alaska: Developing a productivity index. Exxon Valdez Oil Spill Restoration Project Final Report, Project 95031. USFWS, 1011 E. Tudor Rd., Anchorage, Alaska 99503. The same information also will be: Kuletz and Kendall. In press. A productivity index for Marbled Murrelets in Alaska based on surveys at sea. J. Wildlife Management. A related note is: Kuletz and Marks. 1997. Post-fledging behavior of a radio-tagged juvenile Mar-

bled Murrelet. *Journal of Field Ornithology* 68:421-425.

A synopsis of damage assessment and restoration studies on the Marbled Murrelet is available in the Exxon Valdez Oil Spill Restoration Notebook Series (Marbled Murrelet Synthesis Account, by Kathy Kuletz) from the Restoration Office, 645 G St., Suite 401, Anchorage, AK 99501.

Kathy is also working with biologists in the Chugach National Forest (U.S. Forest Service), who received oil spill criminal settlement funds. They plan to map potential murrelet nesting habitat in Prince William Sound by using the Kuletz et al. model of nesting habitat, remote sensing combined with ground-truthing habitat studies, and GIS. Field work will begin in 1998. The goals and approach are similar to those of the Murrelet Effectiveness Monitoring Plan coordinated by **Sarah Madsen**, USFS, in the tri-state region.

The murrelet and guillemot crews at Naked Island (PI for guillemot project is **Greg Golet**) were also successful in their first attempts to capture juvenile murrelets and Pigeon Guillemots at sea. They used the night-time spotlighting technique Kathy learned while attending the Xantus' Murrelet capture effort in California. The Alaska crews hope to expand this effort in 1998 to obtain post-fledging weights and to track marked juveniles.

Oil Spill restoration efforts continue to focus on habitat acquisition. Currently, a densely forested parcel on northern Afognak Island is under consideration. This parcel has high densities of nesting murrelets and is adjacent to numerous small seabird colonies. Negotiations with the Native corporation logging these lands, however, are stalled. If you want to have input, contact **Molly McCammon** (907-278-8012), Director of the Trustee Council.

Greg Golet, **Ted Spencer**, and other field crew members (USFWS and OSU) continued a study of the breeding and feeding ecology of Pigeon Guillemots in Prince William Sound as part of the APEX project, which is designed to investigate food limitation in seabirds. **David Irons**, **Rob Suryan**, and a cast of many others (USFWS and OSU) studied reproductive and foraging ecology of Black-legged Kittiwakes in Prince William Sound as part of the APEX project, which is designed to investigate food limitation in seabirds. **Rob Suryan** and **David Irons** have been working on a

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meta-population paper for Black-legged Kittiwake colonies in Prince William Sound. **David Irons** also monitored populations and productivity of Black-legged Kittiwakes in Prince William Sound. **Diana Bran**, and **Matt Stots**, and **David Irons** (USFWS) monitored populations and productivity of Black-legged Kittiwakes, Pelagic Cormorants, and Red-faced Cormorants in Chiniak Bay, Kodiak Island.

George Hunt, back from a September cruise in the Bering Sea, reported shearwater mortality associated with a broadening of diet from mature euphausiids to trawl offal, squid, and immature euphausiids. Shearwaters were underweight and avoided foraging in the light green waters associated with ongoing coccolithophore blooms. The September cruise was a follow-up on a May cruise that measured bird and oceanographic conditions before the onset of the summer 97 anomaly in the Bering Sea.

David Duffy continues as lead scientist on the APEX Project, examining why seabirds are not recovering from the spill of the Exxon Valdez. He will be also convening and editing the proceedings of the 25th anniversary symposium for PSG. During the current ENSO event, he has been issuing weekly updates on possible ENSO effects. These can be found on the SEABIRD list server and at <http://darwin.bio.uci.edu/~sustain/ENSO.html> on the web, thanks to **Peter Bryant** and **Barry Costa-Pierce** at U.C. Irvine.

By **David Cameron Duffy**, Anchorage, Alaska

WASHINGTON AND OREGON

Washington

Nisqually National Wildlife Refuge (NWR) Complex and other U.S. Fish and Wildlife Service (USFWS) staff, including **Louise Vicencio**, **Jean Takekawa**, and **John Grettenberger**, conducted annual seabird surveys by boat and air at the San Juan Islands NWR in July. New signs were installed on several Refuge islands to reduce wildlife disturbance; they request that boaters observe a 200 yard buffer around the islands. A cooperative agreement with The Whale Museum greatly improved educational efforts to reduce wildlife disturbance there, in-

cluding a Challenge Grant which provided funding to them, to distribute educational materials and conduct field contacts with boaters around the Refuge islands. The final public use plan and environmental assessment for Dungeness NWR was released and new regulations were implemented in May 1997. These regulations are designed to reduce wildlife disturbance and focus on wildlife-dependent recreation. **Ulrich Wilson**, Coastal Refuge Office, continues to conduct long-term monitoring of seabirds, Bald Eagles, Peregrine Falcons and assist with the Oregon and Washington Brown Pelican survey.

Randy Hill reports that a dieoff of whitefish in the Potholes Reservoir area south of Moses Lake attracted hundreds of American White Pelicans to Columbia National Wildlife Refuge. The whitefish dieoff is an annual event occurring at least for the last 8-10 years. The dieoff is assumed to be associated with a water quality problem that whitefish are especially sensitive to but the problem has not yet been identified by Washington Department of Fish and Wildlife (WDFW) fisheries biologists. White Pelicans traditionally have summered from near Grand Coulee Dam throughout the Columbia Basin, and now winter in numbers along the Hanford Reach of the Columbia River. Columbia NWR has had an increase in pelican use for the last six years associated with summer draw downs for vegetation and carp control. Pelicans do an excellent job of carp control when waters are shallow enough for efficient feeding. American White Pelicans nested in the state for the first time since 1926 just three years ago on Crescent Island, in the reservoir formed by McNary Dam on the Columbia River.

Walter Major III, a graduate student at Washington State University (WSU), has begun research on Double-crested Cormorant predation of rainbow trout on smaller, managed inland waters. Under the direction of **Rod Saylor** (WSU) and **Christian Grue** (University of Washington Coop Unit), and using funding from WDFW fisheries, Walter will assess bird abundance and behavior on waters that represent four separate but comparable fishery management strategies to determine the amount of cormorant predation each strategy incurs. Analysis of food habits from stomach contents is dependent upon obtaining permits. Work will continue this fall and through the spring, summer and fall of 1998, and includes

rotenone treated and stocked lakes on Columbia NWR and WDFW managed lands. This work is a follow-up to monitoring by **Randy Hill** (Columbia NWR) and **Jim Tabor** (WDFW) in 1993 which produced inconclusive results.

Don Williamson (USFWS) assisted in the analysis and evaluation of impacts of the "SR 105 Emergency Stabilization Project" to stop continued shoreline erosion at the mouth of Willapa Bay near Cape Shoalwater, WA. Ever-changing designs call for armoring the shoreline, plugging the main tidal channel, and dredging a pilot diversion channel. Concerns include potential for impacting a Brown Pelican roosting island, Marbled Murrelet foraging currents, and Snowy Plover nesting habitat. Dredging started in the summer but ceased after the vessel was damaged in a grounding.

Don Williamson and **Alan Clark** (USFWS) continued banding Doubled-crested Cormorants at Columbia River colonies. A total of 2,498 chicks have been banded in the three years of the project. There have been 35 band recoveries to date from 1,340 chicks banded in 1995 and 1996. This is a 2.6% rate of recovery for the first two years. Locations of returns range from Los Angeles, CA, to the south, Vancouver, BC, to the north, and The Dalles, OR, to the east. The majority of returns (25 of 35) came from the Puget Sound area. These preliminary results suggest that most cormorants fledged in the Columbia River estuary migrate in the fall and spend their first winter, at least, in the vicinity of Puget Sound. For the first time, there was evidence of disease at the colonies. Three chicks at Rice Island and 12 at E. Sand Island were observed with symptoms such as curled toes, "limber neck", and tightly clasped wings they could not extend. Three were sent to the National Wildlife Health Center where diagnoses was Newcastle disease.

The Common Murre die-off in Oregon extended into Washington with increased numbers of dead adults and a near lack of hatching-year birds washing up on Long Beach Peninsula beaches and found during seabird mortality counts conducted by Don this summer. Snowy Plovers had a very successful year in producing fledglings at Leadbetter Point in 1997.

Terry Wahl reports that pelagic trips off Grays Harbor, WA this year have so far indicated very ENSO-like conditions, reminiscent of 1983. SSTs are high, Albatrosses are closer to shore, a Blue Marlin was caught off Westport, bird numbers

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are low, and migration appears late. In particular, Cassin's Auklets and puffins are almost non-existent, though his sample area is not near colonies. Virtually no hatching-year murrelets were encountered this year during his trips. Almost all Rhinoceros Auklets observed were in Grays Harbor or nearshore where there have been big numbers of foraging pelicans and gulls, including large numbers of Heermann's. Elegant Terns have made it at least as far north as Grays Harbor.

Joe Galusha and **Jim Hayward** (Walla Walla College Marine Station, Anacortes, WA) conducted their tenth census of the Glaucous-winged Gulls breeding on the Protection Island National Wildlife Refuge, Jefferson County, Washington.

Numbers of nests located were up three percent from two years ago. There has been a gradual increase in the numbers of gulls breeding here since 1980. Joe and Jim have also been monitoring the numbers of bald eagle-gull interactions occurring on Violet Spit, the main gull breeding area. **Joe Galusha** is also studying quantitative behavioral differences between successful and unsuccessful families of gulls. It is not yet clear whether the observed differences are a result of cause of differential reproduction in this species. This is the second year of a five year project.

Brian Cooper, of ABR, Inc., participated in three studies of Marbled Murrelets during 1997. He continued work with **Paul Henson** (USFWS) on a study evaluating the use of radar for long-term population monitoring of Marbled Murrelets along the Oregon coast. For a second year, Brian collaborated with **Martin Raphael** and **Diane Evans** of the USDA Forest Service, Pacific Northwest Research Station, on a study investigating the feasibility of using a radar as an inventory and monitoring tool for Marbled Murrelets in the Olympic Peninsula. This year they began to document both annual and seasonal variability in radar counts. Brian also worked on a study for the Olympic Natural Resources Center that used radar techniques to help evaluate the current survey protocol for Marbled Murrelets. With the concurrent radar and audio-visual observations, they were able to begin to measure the proportion of birds that are double-counted, missed, or that are detected and continue to fly to another area during a standard survey.

Martin G. Raphael and **Diane Evans**, of the US Forest Service (USFS)

Pacific Northwest Research Station in Olympia, WA, continued collaborative studies on Marbled Murrelets in 1997. At-sea surveys during the breeding season in the San Juan Islands, originally established jointly with the Redwood Sciences Lab in 1994, were conducted this year primarily to evaluate alternative techniques of estimating productivity. Specifically, density-based estimators will be compared with adult/juvenile ratios to assess the appropriate methods for long-term population monitoring. Preliminary results indicate that the ratio of the density of juveniles to pre-breeding density of adults may be a more reliable estimator of productivity than simultaneous ratios of counts. However, they are concerned that neither method yields accurate estimates and that using these estimates to parameterize demographic models is problematic. They are also investigating alternative transect layouts for at-sea surveys, contrasting results from lines running parallel with shore to lines running in zigzag and perpendicular patterns. These studies are supported in part by the USFWS and the National Council for Air and Stream Improvement (NCASI), with collaboration from **Steven Courtney** of Sustainable Ecosystems Institute.

At-sea surveys also were conducted in Hood Canal in conjunction with radar monitoring. **Brian Cooper**, assisted by **Bob Day**, Alaska Biological Research, continued an assessment of radar as a long-term monitoring tool on the Olympic Peninsula. In collaboration, they began to investigate the relationship between at-sea densities and numbers of murrelets traveling inland during the breeding season. The third component of this study looks at the potential of watershed-scale effects of habitat availability on murrelet activity as measured by radar flights. Results will be reported at the upcoming PSG Annual Meeting.

They completed the third and final year of inland surveys on the Quilcene Ranger District of the Olympic National Forest to evaluate Marbled Murrelet habitat characteristics at the stand and watershed levels. Inland dawn surveys were conducted following PSG protocol in 7 subwatersheds, each varying in level of forest management. Habitat attributes were measured at occupied and unoccupied sites, and GIS analysis is underway to correlate habitat structure, landscape pattern, and occupancy.

Also for the third and final year, they collaborated with **John Marzluff**, Sus-

tainable Ecosystems Institute and University of Washington, investigating the risk of Marbled Murrelet nests to predation on the western Olympic Peninsula. This study is supported in part by the Washington Department of Natural Resources (WDNR), Rayonier Timber Co., USFWS, and NCASI, and investigates how the numbers of potential predators change with forest stand structure and forest fragmentation, and how the risk of simulated murrelet nests to these predators increases or decreases under different forest conditions. Preliminary results suggest that the interrelationship between forest patterns and human activity may be the biggest influence on predation risk. Even a large forest stand may not buffer a nest from the intrusion of predators associated with a campground, whereas if the human influence is removed, risk of predation may decrease with more contiguous forest.

David Nysewander, **Joe Evenson**, **Bryan Murphie**, and **Warren Michaelis** (all WDFW), have completed the first five years of marine bird and waterfowl monitoring associated with the Puget Sound Ambient Monitoring Program in western Washington. In 1997 this involved summer and winter aerial censuses of all inner marine waters and adjacent shorelines, which were combined with more intensive focus studies by boat last winter looking at concentrations of loons, grebes, and alcids in central Puget Sound. Aerial surveys this last summer were expanded to include more coverage over several months to assist the management of the sockeye salmon gillnet fisheries to reduce or limit entanglement mortalities for alcids like Common Murres and Rhinoceros Auklets.

Scoter numbers wintering in the greater Puget Sound region have remained at very low levels over the past five year period when compared with the numbers seen in these same areas 17-20 years ago. Preliminary analyses of contaminant levels in scoters by **Mary Mahaffy** (USFWS) and others have failed to pinpoint a cause for this decline.

Mary Mahaffy is continuing the contaminant studies on Surf Scoters in Puget Sound. She completed a report on scoters collected in the Tacoma, Washington area. Overall, surf scoters from the Tacoma area appeared to be healthy. Although concentrations of mercury and chromium slightly increased while the scoters were in the area, they were well below concentrations known to cause

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negative impacts to birds. Concentrations of cadmium, copper and zinc decreased while the scoters were in the area. The scoters were primarily feeding on mussels, clams, tube worms and snails. Scoters were collected in Bellingham Bay, Washington in fall 1996 and late winter 1997; however, analytical results are not available at this time. Scoters in the Bellingham Bay area consumed mussels and/or clams.

Mary Mahaffy and **Lee Robinson** continued a nest box study of pigeon guillemots. Wooden nest boxes at Port Townsend and Grays Harbor are being occupied to a limited extent, but nest boxes have been a success on Protection Island National Wildlife Refuge. Use of nest boxes by guillemots have increased annually on Protection Island since they were first set out in 1994. In 1997, 28 out of 46 boxes were occupied by guillemots, an increase from 19 out of 47 boxes in 1996. However, productivity was lower in 1997 than 1996, with only 1.0 chicks/pair produced in 1997 versus 1.4 chicks/pair in 1996. Also, in 1996, 89% of the occupied nest boxes were successful and only 68% were successful in 1997. Adult birds that were banded as nestlings were observed returning to the colony for the first time this year, although none nested in the boxes.

Tom Hamer of Hamer Environmental (HE), in cooperation with the Mt. Baker-Snoqualmie National Forest and NCASI began testing the feasibility of using modified marine radar to monitor populations of Marbled Murrelets at inland sites in the North Cascades of Washington. Because of the difficulties of observing and studying Marbled Murrelets at inland sites, there is currently no reliable terrestrial tool available to monitor murrelet populations on specific forest ownerships or in particular regions. Knowledge of the statistical power of a survey and monitoring program to detect population trends is essential if surveys are to detect changes in population size or density. Objectives of the pilot study were to: (1) locate sites in the North Cascades that are ideal to use as long-term monitoring locations; (2) ascertain the utility of radar as a long-term inland monitoring tool in this region by sampling these sites and recording the daily and seasonal variability of radar detections to determine the number of samples needed to calculate population sizes and trends; (3) conduct power analysis of the data to determine the probability of detecting population trend

changes between 0% and 15% over a five year period or less. For 1997 the equipment needed was purchased and assembled and more than 50 sites were checked for their suitability as radar monitoring stations in the North Cascade Range. Sampling by radar was conducted at 10 of these sites. At each survey station radar consistently detected many times more murrelet targets than ground observers using the Pacific Seabird Group Survey Protocol methods, especially in areas where little suitable habitat existed and murrelets appeared to call less frequently. Results are preliminary but it appears radar monitoring can produce more accurate and consistent counts of murrelets than ground surveyers and that suitable sites exist throughout the North Cascade range to allow monitoring of murrelets in this region using radar. More intensive sampling at these sites is planned for 1998 to accomplish the third objective.

Tom Hamer (HE) in collaboration with **Dr. Steven Beissinger** of the Division of Ecosystem Sciences at the University of California initiated a research and monitoring study focused on Marbled Murrelets that examines the terrestrial and marine factors affecting murrelet density, productivity and population trends in California, Oregon, and Washington. The goal of the project is to determine the relative importance of forest landscape conditions and marine influences on the productivity and population dynamics of the Marbled Murrelet. It will be accomplished by monitoring the density, productivity, and population trends of the murrelet throughout California, Oregon, and Washington, and then determine how these factors relate to measures of terrestrial and marine habitat quality. Initial cooperators in the endeavor include the USFWS Technical Support Office (Portland), USFWS North Pacific Coast Ecoregion (Olympia), **Chris Thompson** of WDFW, ODFW with **Craig Strong** of Crescent Coastal Research, and University of California, Berkeley. Others cooperators are being sought. The objectives of Phase I of the first two years of a seven year program are to: (1) Define the target populations to be studied and monitored; (2) Conduct a distance sampling marine workshop to standardize methodology and train observers; (3) Assess the application of distance sampling by testing two important assumptions of this method; (4) Refine the marine survey protocols for sampling murrelet population density, population trends and productivity (i.e.

adult/juvenile ratio and juvenile density) within each sampling unit and; (5) Develop a sampling protocol for large scale monitoring. Phase II of the research program will: (1) Monitor the density, productivity, and population trends of the murrelet throughout California, Oregon, and Washington; (2) Complete the development of GIS landscape databases; (3) Calculate measures of forest and marine habitat quality for each local area using GIS databases and Landsat images; and (4) Conduct landscape level census of Corvid populations in each sampling unit in each state to use as a terrestrial factor in the Phase III analysis. The objectives of Phase III are to: (1) Evaluate and better understand the relative importance of forest landscape conditions and marine influences on the productivity (i.e. adult/juvenile ratio and juvenile density) and dynamics of the Marbled Murrelet; multiple regression and multivariate models will be used to examine what combination of marine and terrestrial habitat features best predicts murrelet density, productivity, and population trends; and (2) Examine population trends of the Marbled Murrelet in each sampling unit and across the three-state range. Funding was obtained to begin Phase I of the project. In June of this year they conducted a distance sampling field workshop in Puget Sound to help standardize marine survey methodology and train marine researchers. At the workshop researchers were instructed on how distance sampling technology functions and they reviewed the critical assumptions that researchers need to meet to use distance sampling methodology. A day was then spent instructing researchers how to properly use distance sampling techniques in the field and the group discussed ways to improve the techniques used when conducting marine surveys for Marbled Murrelets. Discussions also began on how to standardize at-sea survey methodology across the range of the murrelet. The workshop ended with a conference call to statistician **Jeff Laake** of the National Marine Mammal Laboratory where participants asked Jeff questions about marine survey designs and how distance sampling methodology could work as a tool to monitor Marbled Murrelet populations. The workshop was a big success and attended by federal, state and private researchers from California, Oregon and Washington. A report of the findings of the workshop will be provided to the USFWS Office of Technical Support in Portland.

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As part of Phase II of their research program they also began testing two important assumptions about the distance sampling methodology that may potentially be violated when applying the technique to the murrelet. Distance sampling methods require that all birds near the transect line be detected and that little movement by birds occur away from the transect line as the boat proceeds and birds are detected. They examined this possibility in detail by determining at what distances murrelets dove, flew or swam away from approaching vessels by using an additional independent observer who located individual birds 200-300 m ahead of approaching boats and documented their behavior. They also examined the number of birds near the transect line that were missed by observers. Vessel size was varied to see how it affected avoidance behaviors. Only a small sample size of 100 matched observations was obtained in 1997 between the standard observers and the independent third observer so that additional data will be collected in 1998. Data is currently being analyzed. The second assumption they tested concerned the accuracy of distance estimates to birds and differences in detectability of juveniles and adults. Distance sampling is susceptible to bias from imprecise estimates of the distance of the bird from the transect. Tests of among observer variation of distance estimates was conducted in 1997. Data is currently being analyzed.

The last objective for Phase I 1997 is to standardize analyses of line transect data sets collected on Marbled Murrelets. A fall workshop with a small group of principle investigators from each region will help train personnel in the use of DISTANCE (Laake et al. 1994) and associated software for making density estimates. The training will help researchers minimize the variation in analyses and errors due to choice of detection functions, bin widths and truncation points of data tails. Data on adult and juvenile seasonal population changes and habitat use will be examined from each area to determine the best methods for determining adult/juvenile ratio's and juvenile density.

Tom Hamer (HE) completed the first year of a three year research program studying Marbled Murrelet nest density and nest success in relation to habitat characteristics in Washington. This is a companion study to a project being conducted by **Kim Nelson** in Oregon that was initiated in 1995 is being funded by the

USFWS, WDNr, and Rayonier Timber Company. In 1997, the study established thirty 40 m radius plots located randomly in three forested sites occupied by Marbled Murrelets. All trees with potential nest platforms were climbed in each plot and old and new nests were located. The objectives of the study were to: (1) determine if nest abundance (density) and nest distribution differed between edge and interior plots, (2) compare stand structures of nest and non-nest plots, (3) locate active nests using tree climbing techniques, in addition to eggshell searches and monitoring murrelet behavior, (4) compare nest and stand characteristics between successful and unsuccessful nests, and (5) describe preferred nest platform, nest tree, and nest stand characteristics. The first year of the study was a great success with nineteen nests located and the structural characteristics of the nest limb, nest tree, and nest plot recorded. The characteristics of random potential nest platforms within the stands were also recorded. Data analysis is preliminary but it appears Marbled Murrelets are selecting western hemlock trees for nesting sites and avoiding western red cedar, Sitka spruce and silver fir trees. Because of the random design, the study will provide the first unbiased descriptions of the range of nest sites used and allow an examination of nest site preference for the species. These data will be crucial to characterizing suitable and optimal habitat, developing silvicultural prescriptions for desired future conditions, providing information for recovery, identifying key variables for adaptive forest management, and developing methods to avoid or minimize take. Results from this study will be used to develop models of stand structural characteristics and configurations that will maximize habitat suitability (based on preference) and reproductive success.

Julia K. Parrish continued to monitor attendance and reproductive success of the Tatoosh Island Common Murre population. Although this colony has suffered from Bald Eagle predation and associated egg-predator facilitation in the past, eagle activity was down this year and murre reproductive success was correspondingly higher. In fact, despite the emerging El Nino, the island's murrelets posted the highest colony-wide reproductive success since she began comprehensive monitoring in 1992. Associated research projects concentrating on prey species, food delivery rates, and adult foraging patterns indicate that like last year the

murrelets are feeding their chicks a wide variety of fish, mainly Pacific Herring, Surf Smelt, Sandlance, and Eulachon. Most of the adults they tagged with radio telemeters stayed well within range of fixed receivers (conservative estimate about 5 miles) suggesting that the waters around Tatoosh may provide ample food even in years of presumable food stress.

Ken Warheit completed the PSG-EVOS Report on Seabird Restoration, and submitted the final report to USFWS and the Exxon Valdez Trustee Council. Ken also continued work on Common Murre population genetics for populations in British Columbia, Washington, Oregon, and California. The genetic work was conducted in collaboration with **Vicki Friesen**.

Chris Thompson, WDFW, was involved with a number of research projects this past summer focusing on Marbled Murrelets and Common Murres in Washington. Chris had five goals for the summer of 1997 and his first goal was to conduct 8 replicates of transects oriented parallel to shore at 200, 400, 800, and 1200 meters from shore, and in a zigzag or sawtooth pattern between 100 and 1300 meters from shore, in order to determine which method yields a "better" (i.e., lower variance, higher statistical power) index of Marbled Murrelet and Common Murre abundance. His second goal was to survey the entire Washington coast as thoroughly as possible both geographically and seasonally to determine general patterns of abundance and distribution of these species. Chris also conducted land-based and at-sea surveys of murrelets using the Point Grenville complex of rocks off of the Quinault Nation Reservation (city of Taholah) and he also surveyed the entire outer coast of Washington repeatedly throughout the summer with the specific goal of trying to monitor the south to north movement of dad-chick pairs of Common Murres from the Oregon border (Columbia River) up to and eastward down the Strait of Juan de Fuca. Chris also coordinated an extensive survey of Washington beaches for dead birds from mid-June through mid-August.

Chris has not analyzed most of his survey data yet, however, the land-based surveys documented successful breeding of about a dozen murrelets visible from land on Big Stack at Point Grenville. Chris estimates there were a total of 300-500 murrelets on Big Stack this year and the may have fledged at least 100 chicks. This is the first confirmed breeding at a Wash-

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ington colony other than on Tatoosh Island since the El Nino of 1982-1983. Perhaps more significant was the finding that the colony followed a phenology essentially identical to that of Tatoosh Island, and not of Oregon colonies which are about a month earlier.

Despite the relatively low reproductive success of murrelets at central and north Oregon colonies this year, Chris was able to accurately track a south to north movement of dad-chick pairs. Dad-chick pairs first appeared in southern Washington in mid-July, and appeared progressively further north, and finally into the strait of Juan de Fuca by early to mid-August. In their beached seabird study, Chris and others surveyed all of the beaches of the outer Washington coast from Point Grenville south to the Columbia River, and much lesser effort further north and in the Strait of Juan de Fuca. Most of their effort was concentrated in a 27 mile stretch of beach between Ocean Shores, immediately north of Gray's Harbor, to Point Grenville. From mid-June through mid-August they collected nearly 2000 dead murrelets on this single stretch of beach. Various stretches of this 27-mile track were surveyed every 1-4 days, usually every other day. In general, the rate at which birds appeared on the beaches increased rapidly from mid-June through early July to a maximum rate of about 4 murrelets per mile of beach per day, and then rapidly declined to about 1 murre per mile per day for couple weeks. By early-mid-August, the die-off was essentially over—at least as far as birds showing up on beaches.

Oregon

Tom Hamer (HE) began a feasibility study this fall for the Oregon Department of Forestry (ODF) in Northwest Oregon as part of a planned Habitat Conservation Plan (HCP) for the region. The purpose of the project is to develop a habitat suitability rating system for Marbled Murrelet habitat on ODF managed lands in Northwest Oregon. The rating system or predictive habitat model would be used to develop a long-term HCP for Marbled Murrelets in cooperation with the USFWS. An accurate habitat rating system for murrelets in this region that could predict murrelet occupancy and assess the relative value of the habitat to the population may allow ODF to cease protocol surveys and use the rating system to measure and sample murrelet habitat in a

standardized and repeatable fashion, and assess the likelihood that a stand used by murrelets as nesting habitat. The model would also enable ODF to compare the relative habitat value of different stands and amounts of habitat to the murrelet population, estimate the impact to murrelets and suitable habitat from proposed activities outlined in the HCP, and provide information on how to develop habitat in the future.

A cooperative study with **Paul Henson** of the USFWS, **Tom Hamer** (HE) and **Kim Nelson**, was conducted in the spring and summer of 1997 to determine if nesting Marbled Murrelets are negatively affected by human disturbance. Other cooperators included the USFS, Bureau of Land Management (BLM), private industry, and state forestry and wildlife agencies in Washington, Oregon, and California. Four active nests were located in 1997 in Oregon and Washington. Researchers planned to generate artificial disturbances near the nest sites and record the response of adults and chicks. Three nests failed too early to be used for the study but one nest in Washington was monitored for three weeks with an infrared video camera and responses of adults and the chick to various disturbances were recorded. Data is in the process of being summarized and analyzed. Researchers hope to observe a larger sample of nests in 1998.

Craig Strong and **Mark Fisher** conducted the 6th year of surveys of Marbled Murrelets off the Oregon coast for the Oregon Dept. of Fish & Wildlife (ODFW). Repeated surveys of central and southern Oregon sub-areas were conducted this year to improve power in detecting population trends, as opposed to the statewide coverage attempted in previous years. Their initial, unquantified impression is that lower numbers of murrelets occurred in central Oregon, but productivity in central and southern Oregon appeared higher than in prior years. Concurrent with murrelet surveys, a large database on abundance and productivity of other seabirds in nearshore waters of Oregon and northern California has been assimilated. The survey season was cut short this year in mid-August when their outboard motors failed and the boat was capsized in the surf (no injuries, fortunately).

In collaboration with **Roy Lowe** and **Dave Pitkin** (USFWS), Craig and Mark initiated a preliminary program to sample seabird prey with partial support from and

California Department of Fish & Game. Gillnet, throw net, seines, otter trawls, herring jigs, and hydroacoustic methods were used in the nearshore environment of the Marbled Murrelet. All methods except the seine produced results, but all had limitations as well. Surf Smelt and Night Smelt were the most frequently occurring species. The small, mobile nature of prey patches made it difficult to collect representative prey samples, but there was an obvious relation between seabird feeding activity and hydroacoustic signals. Improved net design and a focused sampling program show great potential for relating prey composition and ecology with seabird distribution and productivity.

For **Pat Jodice** the summer of 1992 should mark the final field season of his Ph.D. degree program studying Marbled Murrelets in Oregon. This past summer was spent conducting more intensive inland surveys in the Oregon Coast Range. Pat monitored five different survey sites at least 55 times each. Three of the five sites were also monitored in 1994 and 1996. Numbers of daily detections at these sites appear to be less than those recorded in 1994 but similar to those recorded in 1996, however, further data analysis is necessary. Variability of daily detections at these three sites appeared to be higher in 1996 and 1997, than in 1994.

Ken Collis and **Stephanie Adamany** of the Columbia River Inter-Tribal Fish Commission, and **Dan Roby**, **David Craig**, **Tom Ruskowski**, and **Kyle Brakensiak** of the Oregon Cooperative Wildlife Research Unit at Oregon State University (OCWRU-OSU) conducted a field study of avian predation on juvenile salmonids in the Columbia River Basin. Their work focused primarily on Caspian Terns and Double-crested Cormorants nesting in the Columbia River estuary. The Caspian Tern colony on Rice Island (a dredge spoil island northeast of Astoria) numbers about 8,000 pairs, the largest known colony of this species in North America and perhaps the world. About 85% of the diet of this tern colony consisted of juvenile salmonids. Only about 400 young were fledged from the colony, however, due to high kleptoparasitism and predation rates, primarily by western/glaucous-winged gulls. About 6,000 pairs of double-crested cormorants nest at two colonies in the Columbia River estuary and their reproductive success was markedly higher than the terns. Also, cormorants did not specialize as much on

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juvenile salmonids as did the terns. The proportion of juvenile salmonids in the diets of gulls, either in the estuary or further up river, was small.

S. Kim Nelson and **Amanda K. Wilson**, (OCWRU-OSU), with the help of **Kimberly Augenfeld**, **Suzi Freeman**, **Diane Gilbert**, **Sean Stephens**, **Scott Hyde** and **Joe Tremblay**, continued their research on characterizing Marbled Murrelet habitat on state lands in western Oregon (Tillamook and Elliott State Forests). 1997 was the third year of this five year project funded by ODF, ODFW and USFWS. A total of 23 Marbled Murrelet nests (19 old and 4 active) have been located to date. Two additional active nests are known on the Tillamook forest from 1994. Of the active nests, two were successful (1994 and 1995), three failed from predation during the chick stage (1994 and 1997), and one chick starved to death (1997). These 25 nests were located in young, mature and old-growth forests with large platforms or mistletoe and other limb deformations that provided a suitable substrate for nesting.

Surveys for Marbled Murrelets were also conducted at Mt. Rainier National Park in the Washington Cascades by **Kim Nelson**, **Gayle Anderson** and **Tanya Zastrow**, in a project funded by the National Park Service. Study areas included the Carbon River, Mowich and Tahoma River drainages. Murrelets were detected and are suspected to be nesting in the Carbon and Mowich River drainages, located in the northwest corner of the park. No detections were recorded along the Tahoma River which is located in the southwest corner of the park and further from Puget Sound. In the future, tree climbing may help to locate nest sites along the Carbon and Mowich Rivers.

Nelson is also working with the USFS PNW Research Station to develop models of murrelet habitat in the Oregon Coast Ranges Province. The study will include using Landsat Thematic Mapper images and habitat information from ground plots to develop stand- and landscape-level models that best predict differences between occupied murrelet sites and random sites. In addition, offshore data provided by Craig Strong will be used to determine the relationship between murrelet occurrence offshore and distribution of inland suitable habitat.

She also authored the Birds of North America account on the Marbled Murrelet. Copies of this publication, which was published by the Philadelphia Acad-

emy of Sciences and the American Ornithologists' Union, is available from Buteo Books at (800)722-2460.

In response to the developing El Nino conditions in Oregon, Astoria school teacher **Mike Patterson** began conducting 1 hour, weekly timed seawatches at two coastal locations in Oregon. Using the connectivity of the internet, he also asked interested observers to make regular, timed watches from vantage points all along the Oregon and Washington Coast. The protocols were intended to be relatively simple and non-threatening. The observer was asked to spend an hour watching seabirds each week sorting them as flying by, sitting on the ocean or sitting on rocks or beaches. There was no attempt to define "seabird" therefore any bird species (i.e., ducks, raptors or passerines) seen during the period were counted. Time of day, wind direction and speed, temperature, cloud cover and tide were recorded. Three observers at four sites produced regular observations using the same protocols, two on headlands and two on jetties. Others contributed observations from sites without all protocols in place. The resulting collected observations have been archived at <http://www.pacifier.com/~mpatters/enso/jetty.html>. It is Mike's intention to continue these seawatches through several consecutive years and to look for correlations to nearshore ocean conditions.

Under the direction of **Jan Hodder** of Oregon Institute of Marine Biology, students continued with the long-term Pelagic Cormorant monitoring project at Cape Arago. This was the 25th consecutive year that this colony has been studied. Jan will present a poster on this project at this years annual meeting in Monterey, CA.

Roy Lowe and **David Pitkin** of the USFWS, Oregon Coastal Refuges Office continued seabird monitoring projects during the summer of 1997. Aerial photographic surveys were conducted of all Common Murre and Brandt's and Double-crested Cormorant colonies on the Oregon coast. Select colonies will be counted for annual population monitoring. In addition, for the third consecutive year 3 replicate aerial photographic surveys of 15 north coast Common Murre colonies were conducted. Other field work included monitoring Pelagic Cormorant nesting attempts at 17 colonies near Newport. For the 11th consecutive year a beached bird mortality study was conducted on 7.1 km of beach located be-

tween Seal Rock and Alsea Bay in Lincoln County, Oregon. This study is conducted from June through September and the number of dead adult murrelets recorded this year was the second highest since the study began. In late September, **Roy Lowe**, **David Pitkin**, **Eric Nelson**, (USFWS) and **Deborah Jaques** conducted an aerial survey of Brown Pelicans along the Oregon and southern Washington coasts. The survey recorded the fewest number of pelicans in the survey area over the last 10 years as migration had apparently begun earlier and occurred more swiftly possibly due to El Nino conditions and extremely early winter storms. Surveys of Aleutian Canada Goose use of Oregon coastal rocks and islands also continued this year.

Bob and Shirley Loeffel and **Don and Sara Brown** continued to conduct their long term beached bird mortality transects near Newport, Oregon. Their study is conducted on 7.4 km of beach just south of Newport, Lincoln County, Oregon. This is the 20th consecutive year of this study. The number of dead adult murrelets found on their beach during June and July was the second highest in 20 years.

Dave Huber (BLM-Eugene) conducted Marbled Murrelet protocol surveys at eight sites. One site was documented with occupied behaviors. The other seven had no detections for the year. They also monitored four known occupied sites, and three of the sites still had occupancy. They also conducted three surveys using the high frequency radar and after seeing the results from those surveys, they have decided to pursue a study using radar to determine the population and distribution of Marbled Murrelets on the mid to upper parts of the Siuslaw River drainage.

Larry Mangan reports the Coos Bay BLM District conducted 469 Marbled Murrelet surveys predominately in the Oregon Coast Range. Locations included areas within the Smith and Umpqua River drainages east of Reedsport, areas within the Coquille River drainage south and east of Coos Bay, and an area in the Klamath Province east of Brookings. The surveys resulted in 377 detections of murrelets and 22 new occupied sites. The District participated in the 6th year of an inter-agency study conducted by the Oregon Natural Heritage Program to determine Western Snowy Plover productivity along the Oregon Coast. Key study areas within the District were the New River - Floras Lake area south of Bandon and the Coos Bay North Spit. Nests were protected

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from predators by wire enclosures. Data from the study will be available in late fall. In addition, the District removed European Beachgrass and deposited shell fragments on the North Spit of Coos Bay in a continuing effort to restore former plover habitat. Two seasonal employees conducted educational sessions and monitored recreational use in the Floras Lake area to minimize human impacts on nesting birds.

Joe Witt (BLM-Roseberg) has completed six years of monitoring and inventory of the inland distribution of Marbled Murrelets in Douglas County, OR, and he has submitted a manuscript of his work to Northwest Science. The inventory and monitoring (889 surveys at 105 sites) using PSG standards involves both timber sale actions (33%) and general distribution sites (66%) ranging from 30 to 47 miles inland. Three occupied sites were located within 36 miles of the coast, plus three sites with detections only, were recorded within 38 miles from the coast. A manuscript has been submitted to Northwest Naturalist on the farthest inland nest site for the Marbled Murrelet in 1994. The manuscript deals with both habitat and the behavior around the unique site. Mean arrival time at the nest site was later than previous observations (i.e., literature) plus there was a distinct pattern in the detection rate during the nesting season. High then low, then high again, range: 4 to 25 detections per survey.

By Roy Lowe, Newport, Oregon

NORTHERN CALIFORNIA

H.T. Harvey and Associates biologists **David Ainley** and **Larry Spear** have been conducting seabird research through a variety of studies: 1) they are continuing with weekly censuses of marine birds and mammals at the deep ocean disposal site designed to receive dredged materials from San Francisco Bay. Marine birds and mammals are censused from SF Bay out to the disposal site (20 nm west of the Farallon Islands and 50 nm from the mainland). In conjunction with this project they are also participating in oceanographic cruises that examine mid and surface-water faunas near the site during three oceanographic seasons each year: winter (Davidson Current), upwelling, and oceanic periods. This effort, begun in 1985, is allowing the assessment of

changes in the avifauna on a seasonal and annual basis and has shown a continuing trend in long-term declines of cold-water species; 2) they recently completed an analysis of the marine avifauna in the vicinity of the Hawaiian Islands, using data gathered over a 10-year period, 1983-1992, and have also completed the Birds of North America species account for Newell's and Townsend's shearwater; 3) in collaboration with the Research Unit for Wildlife Population Assessment (**Scotland, S. Buckland**), they continue to develop statistical procedures to estimate the abundance of seabirds using at-sea censuses. They have also been invited to participate in a cruise in the Indian Ocean by the French Antarctic Program in order to assist in refining French at-sea census techniques used for the past 15 years; 4) they are about to embark on their second field season, in collaboration with Land-Care Research New Zealand, to investigate the factors affecting geographic structures of seabird colonies (e.g., size and spacing). The project, centered on penguins in the Ross Sea, uses classical colony-based research at three colonies, radio telemetry to determine feeding areas, assessment of food loads and changes in body weight of parents, aerial censusing of colony populations (15 yr. record), and satellite imagery of pack ice characteristics (15 yr. archive).

Sarah Allen (National Park Service-Point Reyes Nat'l Seashore) initiated surveys for the presence/absence of Ashy Storm-Petrels at the Point Reyes Headland in 1997 using tape playback. Weather conditions hindered most of the surveys but she plans to continue next year. Sarah, along with **Carol Keiper** (Moss Landing Marine Laboratories), also participated in a week-long cruise in central California surveying marine birds and mammals. Seabird activity was very patchy and the water temperature reached 18 degrees centigrade during the trip. Work continues on Snowy Plovers at Point Reyes beaches. In cooperation with **Gary Page** and **Jennifer White** (Point Reyes Bird Observatory - PRBO), nests exclosures were built and placed around 19 out of 25 nests in order to provide protection from predation by Common Ravens. Only nests with exclosures produced fledglings (26 fledglings from 43 chicks). This is the second year of this project and plans are to continue next year. In addition, a long-term management plan is in the works for Snowy Plovers at Point Reyes. Along with these

projects, Sarah continues to collaborate with the USFWS-San Francisco Bay NWRC (SFBWNRC) and PRBO (see below) on continuing studies of Common Murres at colonies located within the Seashore. She has also been involved in the Natural Resource Damage Assessment of the October 1996 Cape Mohican oil spill in San Francisco Bay. This spill, which spread from the Bay south to Thornton Beach and north to Drakes Bay, affected shorebirds, seabirds and other marine species.

Harry Carter, **Gerry McChesney** and **Bill McIver** continued their contract work with USGS-BRD (Dixon Field Station) and Humboldt State University Foundation. They are completing a third year of studies on Ashy Storm-Petrel breeding biology at Santa Cruz Island, California. McIver plans to write up the storm-petrel data for a Master's thesis at Humboldt State University. Aerial surveys of California Channel Islands Brandt's and Double-crested Cormorant breeding colonies were conducted again for the seventh straight year. **Gerry McChesney** completed his Master's thesis entitled "Breeding biology of the Brandt's Cormorant at San Nicolas Island, California" (congratulations Gerry!). Xantus' Murrelet work included nest surveys conducted on West Anacapa Island (with **Frank Gress** - see below). Carter and McChesney also cooperated with **Darrell Whitworth** and **John Takekawa** (USGS-BRD, California Science Center) on a radio telemetry study and surveys of Xantus' Murrelets in the Channel Islands. Carter continued his cooperative efforts with USFWS-SFBWNRC on restoration of Common Murre colonies in central California (see below) and with the California Dept. of Fish & Game on radio telemetry of Marbled Murrelets in central California (see below). Carter, **Scott Newman** (UC Davis) and **Roger Helm** (USFWS-Portland) were invited by the Wild Bird Society of Japan to assist with the assessment of damages from an oil spill in the Sea of Japan that occurred in the spring of 1997.

Frank Gress (Dept. Of Wildlife, Fish & Conservation Biology-UC Davis; California Institute of Environmental Sciences), in cooperation with **Dan Anderson** (UC Davis), **Scott Newman** and **Paul Kelly** (CDFG-OSPR), has been involved with a study funded by OSPR assessing impacts to Brown Pelicans oiled in the Cape Mohican spill in San Francisco Bay. A total of thirty pelicans (mostly juve-

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niles), both rehabilitated and healthy (serving as controls), were fitted with radio transmitters and followed via ground and aerial surveys. This study will continue through November of this year. Frank has also continued his efforts at refining aerial survey techniques of Brown Pelican, Double-crested and Brandt's cormorant colonies on Anacapa Island using large-format, high resolution photography. He has found that this technique works well for pelican colonies, but is only marginally useful for cormorants because of their nesting habitat (cliffs). Other work includes finishing a summary of organochlorine contaminants in Double-crested Cormorants and Brown Pelicans from the years 1977-1992 and collaboration with **Gerry McChesney** and **Harry Carter** on nest habitat characterization of Xantus' Murrelets breeding on Anacapa Island.

Jim Harvey and graduate students (Moss Landing Marine Laboratories-MLML) are continuing various seabird studies in the Monterey Bay area. **Scott Benson** (in conjunction with **Don Croll** and others at UCSC) is continuing a second year of strip transects for seabirds and line transects for marine mammals in Monterey Bay. The visual surveys are conducted while also gathering hydroacoustic information regarding prey relative abundance and distribution and net tows to identify prey species and size classes. Surveys are conducted mostly during late summer and fall. **Jennifer Parkin** is finishing her research on Caspian Terns in Elkhorn Slough. She began her studies in 1993, determining feeding ecology, nesting chronology and the possible effects of pollutants on the reproductive failure of this colony in 1995. **Jamie Scholton** is finishing his studies of Brandt's Cormorants near Monterey. Since 1993, he has investigated the attendance and colony size, food habits and nesting behavior of a large colony on Bird Rock (Point Lobos). **Pam Byrnes** is completing her studies of Great and Snowy Egrets and Great Blue Herons in Elkhorn Slough. She has investigated the distributional patterns relative to habitat types, foraging behavior and abundance of these species. Other MLML work includes training local volunteers to conduct beach walks in the Monterey Bay area as part of a monitoring program funded by the Monterey Bay National Marine Sanctuary and California Urban Environmental Research and Education Center. The goal is to establish a 10-20 year dataset re-

garding stranded seabirds and marine mammals that may be used as a baseline for monitoring upper trophic levels of the sanctuary.

Deborah Jaques and **Craig Strong** (Crescent Coastal Research) initiated studies of seabirds at Castle Rock NWR for the USFWS (**Kevin Foerster**, **Kim Forrest** at Humboldt Bay NWR). Boat and shore-based surveys, along with analysis of aerial photographs taken by **Mike Parker** (USFWS/SFBNWRC-see below) and **Harry Carter** will produce updated population estimates for Common Murres, Tufted Puffins, Pigeon Guillemots, and all three cormorant species on Castle Rock, the second largest seabird colony in California. Pelagic Cormorant productivity was monitored at a smaller colony nearby, and data on productivity of murres and guillemots was collected in conjunction with research on Marbled Murrelets (see Oregon report). Work conducted this season will hopefully represent the beginning of an annual monitoring program and a basis for future studies to include auklets and petrels. Deborah and Craig developed a preliminary biological assessment of impacts of human disturbance to seabirds and marine mammals from lighthouse restoration at St. George Reef in Del Norte County. Nesting Pelagic Cormorants, post-breeding Steller Sea Lions and a Peregrine Falcon roost site are the primary concerns. Field work on this project will continue into the fall. Deborah (working for CDFG North Coast Region) conducted surveys of waterbirds at Lakes Earl and Talawa, a large coastal lagoon system which supports nesting Western Grebes. She also surveyed beaches in Del Norte County for nesting Snowy Plovers. Craig and **Mark Fisher**, in cooperation with CDFG-OSPR (**Paul Kelly**), initiated a seabird prey sampling program in northern California. Gillnets, throw nets, otter trawls and herring jigs all had limited success, and seines were promising with design modifications. Osmerid smelt were the most common among the 10 prey species caught. Once the kinks have been worked out, this prey sampling program will hopefully provide excellent information when integrated with seabird monitoring and tracking of oceanographic variables.

Scott Newman and **J.G. Zinkl's** (UC Davis - Wildlife Health Center) research on baseline blood parameters of seabirds was completed in December 1996 and a report entitled "Establishment of hema-

tological, serum biochemical and electrophoretogram reference intervals for species of marine birds likely to be impacted by oil spill incidents in the state of California" was produced. Blood reference ranges were established for 9 species of birds during the past several years through the collaborative efforts of numerous volunteers, personnel and agencies. The project was supported by **Mike Sobey** and **Dave Jessup** (CDFG-OSPR). Scott is also involved in another collaborative effort to measure stress levels associated with effects of capture, restraint and attachment of radio-telemetry units on Xantus' Murrelets. This study will elucidate the biological effects of these procedures on this species and will assist with the identification of better handling techniques for all marine bird species. This work is funded by the Oiled Wildlife Network's Competitive Grants Program and cooperators include: **Harry Carter**, **Darrel Whitworth**, **Gerry McChesney**, **Bill McIver**, **John Takekawa**, and **Paige Martin** (Channel Islands Nat'l. Park). Scott has also been a cooperator on a study of Marbled Murrelets in central California (see MAMU section below). For the third consecutive year, Common Murre carcasses were recovered along the central California coast by numerous groups (CDFG, USGS-BRD, USFWS, NOAA-Gulf of the Farallones National Marine Sanctuary and Monterey Bay National Marine Sanctuary's beach watch programs, Monterey ASPCA and International Bird Rescue and Research Center). Murres recovered in 1995 were necropsied and found to be extremely emaciated, some with fungal lesions and others with fish hooks present in their stomachs. Roughly 50 murres from 1996 will be necropsied this year. Twelve murres found in 1997 were necropsied in mid-August but did not show signs of emaciation. Brevetoxin, a biotoxin associated with red tide is being investigated as a possible cause for this year's die off.

Mark Rauzon participated in surveying seabirds and searching for Spectacled Eider nests on St. Lawrence Island this summer with the USFWS-Migratory Bird Division. He continued research on Hawaiian Stilt's response to habitat restoration as part of a mangrove eradication program on the Kaneohe Marine Corps Base. Here he also monitored the reproductive success of Red-footed Boobies nesting in the Ulupa'u Crater where native vegetation has been reintroduced to help suppress fires that threaten the col-

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ony. Also, Mark's children's book "Seabirds" was recently published in paperback (congratulations Mark!).

Marbled Murrelet Research

Esther Burkett (CDFG) continued her efforts to coordinate Marbled Murrelet research in California. Working in cooperation with **Paul Henson** and **Lynn Roberts** (USFWS), **John Takekawa**, **Harry Carter**, **Scott Newman**, **Rick Golightly** (Humboldt State University), **Gary Strachen** (Ano Nuevo State Reserve), **Dave Jessup**, **Bud McCrary**, **John Bulgar** (Big Creek Lumber Co.), and **Dana Jones** (Big Basin Redwoods State Park), CDFG launched a radio-telemetry study of Marbled Murrelets in the Santa Cruz mountains area of central California in May 1997. The study, funded by the USFWS, entailed three capture efforts conducted in May, June and August utilizing the spot-lighting and dip net technique perfected on Xantus' Murrelets in the Channel Islands by **Darrell Whitworth**, **Harry Carter** and others. Forty-three murrelets were captured in Ano Nuevo Bay, 24 of which were radio-equipped in the May and June efforts. Most of the birds had fully developed brood patches. Blood samples collected by **Scott Newman** from 41 murrelets will be analyzed for baseline parameters. Stress hormone and genetic analyses will be performed by **Vicki Friesen** (Queens University, Canada) for comparison with other populations of murrelets in the northwest and Canada. Two birds were recaptured in August that had been radio equipped in May. Two CDFG patrol vessels as well as a private vessel owned by **Jim Christmann** assisted with the capture of birds. CDFG pilots and pilot **Bob VanWagenen** (Ecoscan Resource Data) tracked birds from the air. Tree climbing was conducted by **Jim Spickler** and **Dana Laughlin** (Eco-Ascension Research). Four nest sites/areas were located inland: 2 at Big Basin Redwoods State Park, 1 in Pescadero Creek County Park, and 1 at Scott Creek (Big Creek Lumber Co.). An additional nesting attempt was also documented at Big Basin but the pair abandoned the site prior to egg-laying, possibly due to human disturbance. The telemetered bird from this pair may have been taken by a Peregrine Falcon. All four confirmed nests failed, one due to predation by a Red-shouldered Hawk. Causes of the other nest failures are unknown, but Steller's Jays were noted as numerous in

the vicinity of all of the sites. Data is still being compiled and analyzed and will be presented at the PSG meeting in January 1998. Plans for next year are still in the works, but should continue with additional research aspects being explored.

Ben Becker and **Steve Beissinger** (UC Berkeley) continued their 3rd year of at-sea surveys from Santa Cruz to Half Moon Bay investigating density and productivity of Marbled Murrelets. Their data suggest that 1997 was another year of low productivity. This work will continue in 1998 and Ben has been accepted into the PhD program at UC Berkeley and will be conducting murrelet research under **Steve Beissinger**. **Jack Ames** and **Paul Kelly** (CDFG) assisted with this study by providing support and access to a vessel for extensive surveys. Big Creek Lumber Co. also provided support for the project.

C.J. Ralph and **Sherri Miller** (USFS-Redwood Sciences Lab) continued their at-sea surveys of murrelet density and productivity in northern California. They also conducted inland surveys on Pacific Lumber Co. lands and in Humboldt Redwoods State Park. The inland surveys were done as part of the baseline data for the Pacific Lumber Habitat Conservation Plan, which is still under heavy negotiation.

Steve and **Stephanie Singer** (Santa Cruz Mountains Murrelet Group) conducted their 18th season of inland monitoring of murrelets and their nesting habitat in the Santa Cruz Mountains. They continue to find new occupied sites. With assistance from **Mike Jani** and **John Bulger**, Steve completed mapping of the remaining old-growth forest in the area for inclusion in a forthcoming Habitat Conservation Plan. Next summer Steve and Stephanie plan to continue their research on the location and characterization of Marbled Murrelet nesting habitat. Supporters of this research have included the California Dept. of Parks and Recreation, the Sempervirens Fund, the Save the Redwoods League, and the Santa Cruz Mountains Bioregional council.

Point Reyes Bird Observatory (PRBO) Farallon Island and Marine Programs: A new Farallon Biologist, **Kelly Hastings** (formerly of University of Alaska), was hired in the spring of 1997. She, along with **Bill Sydeman** and **Michelle Hester**, in cooperation with the USFWS-SFBNWRC, continued long-term monitoring of population size, reproductive performance and prey utilization of twelve species of seabirds breeding on

Southeast Farallon Island (SEFI). Other work on SEFI includes cooperation with **Joelle Buffa** (USFWS-SFBNWRC) to implement new management and protection strategies for the declining Ashy Storm-Petrel (see below). **Bill Sydeman**, **Harry Carter**, **Jean Takekawa** (USFWS-Nisqually NRWC) and **Nadav Nur** (PRBO) have completed a comprehensive investigation of Common Murre population trends on SEFI from 1985-1995. Other work on murrelets conducted by **Hester**, **Hastings** and **Sydeman** included collecting data on attendance patterns, k-correction factors, non-breeding attendance and breeding site history as part of a collaborative effort with the USFWS-SFBNWRC Apex Houston Seabird Restoration Project (see below). **Nathan Fairman**, **Julie Thayer**, **Marcy Brown** and **Karen Carney**, in cooperation with **Daphne Hatch** (NPS-Golden Gate National Recreation Area), continued to monitor the disturbance effects of human use on seabirds, particularly Brandt's Cormorants, breeding on Alcatraz Island. Fairman and Thayer also continued the sixth year of monitoring of the Rhinoceros Auklet population and other wildlife on Ano Nuevo Island for the Ano Nuevo State Reserve. This project is funded by the Monterey Bay National Marine Sanctuary and as well as by private foundations. **Jennifer Roth** and **Sarah Thome**, in cooperation with **Paige Martin** (Channel Islands National Park), are continuing to monitor the population size, productivity and phenology of eight species of seabirds breeding on Santa Barbara Island. At the Point Reyes Headlands, **Julie Thayer**, collaborating with **Sarah Allen**, continued a third year of monitoring of Common Murre and Brandt's Cormorant colonies at Elephant Cove Beach. **Sydeman**, **Mary Beth Decker** and **Dan Howard** (Cordell Bank National Marine Sanctuary) continued another year of research into the relationship between the Point Reyes Upwelling Plume and the distribution and abundance of macrozooplankton, larval and juvenile fish and seabirds. This year's work was expanded to include the Davenport Plume. **Bill Sydeman** continues his work on his PhD dissertation at UC Davis, **Michelle Hester** has almost completed her M.S. thesis at MLML, and **Nathan Fairman** will be heading off to graduate school at Simon Fraser University.

Pacific Flyway Project: **Gary Page** and **Lynn Stenzel** are continuing to summarize many years worth of data from the

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Pacific Flyway project. They collaborated for a second year with **Sarah Allen** (see above) in placing predator exclosures around Federally Endangered Snowy Plover nests on Point Reyes beaches. This project has been very successful to date and will continue next year. Gary and Lynn also worked with USFWS-SFBNWRC biologist **Erin Fernandez** (see below) in placing exclosures around plover nests in Monterey County. **Dave Shuford** conducted surveys of Black Terns in the interior of California as part of a status review of this species for the USFWS.

USFWS/San Francisco Bay NWR: In early 1997, Joelle Buffa, formerly of the U.S. Forest Service, took the Supervisory Wildlife Biologist position left vacant at the Refuge when Jean Takekawa moved to the Nisqually NWR.

The Apex Houston Seabird Restoration Project, led by Refuge biologist **Mike Parker**, in conjunction with Humboldt State University Foundation biologists **Jennifer Boyce** and **Elizabeth McLaren**, continued for a second year. With able boat assistance from **Harry Carter**, decoys of Common Murres were again placed on Devil's Slide Rock in late January 1997. In early March, **Virginia Collins**, **David Nothhelfer** and **Richard Young** joined the team. Information on attendance patterns, behavior, productivity, diet and anthropogenic factors was collected from Common Murre colonies at Point Reyes Headlands, Castle Rocks and Hurricane Point Rocks, in addition to Devil's Slide Rock. Aerial surveys of seabird colonies located throughout central and northern California were conducted as part of an ongoing effort to monitor long-term trends in breeding population sizes. At the Devil's Slide Rock colony, a total of 3 Common Murre chicks fledged in 1996 and 6 fledged in 1997. The refuge is working cooperatively on this project with **Harry Carter** (USGS-BRD), **Rick Golightly** (Humboldt State University Foundation), **Steve Kress** (National Audubon Society), and **Bill Sydeman**, **Michelle Hester** and **Kelly Hastings** (PRBO).

Refuge biologist **Joy Albertson** and others are continuing efforts to monitor the recovery of California Clapper Rail populations in San Francisco Bay marshes. She is also monitoring Snowy Plovers breeding at the Refuge. **Joelle Buffa** is working with PRBO to develop and implement a design for predator ex-

closures to protect Ashy Storm-Petrels from predation by Western Gulls on SEFI. Two exclosures will be erected this fall to test their effectiveness. Biologist **Erin Fernandez** continued her collaborative efforts with PRBO to monitor and protect Snowy Plover at the Salinas NWR and at other sites in Monterey County. Predator exclosures were again erected around nests in 1997.

Other News

The California Seabird Research Coordination Workshop was held in late January 1997 and hosted by **D. Michael Fry** at the Center for Avian Biology, UC Davis. The workshop was well-attended and served as an excellent way of exchanging information about research activities and funding opportunities in California. The next workshop is scheduled for 14 November 1997 will again be hosted by **Mike Fry** at the Center for Avian Biology. For details on the January meeting or the upcoming November meeting, contact Mike at (916) 752-0753.

By **Elizabeth McLaren**, Newark, California

SOUTHERN CALIFORNIA REGION

Gene Fowler has returned from a sabbatical year and is back teaching conservation biology and comparative endocrinology at Pomona College. He spent part of the sabbatical continuing his studies of stress responses in Magellanic penguins in Argentina. In one ecotourism-related study, he found that visitation rates of 3,000 - 5,000 tourists per year over the last 5 years have not resulted in habituation at the hormonal level, even though the birds behave more calmly than those on a non-tourist island. He's also currently conducting discussions with USFWS about beginning ecotourism-stress studies on Midway Atoll NWR, targeting especially the albatrosses there.

Judith Latta Hand is not currently involved in any ornithological research, but instead, is exercising her right brain with creative writing. She continues to write her thriller novels, using her vast knowledge in ecology and her years of travel as background. She is at present trying to publish her second novel in the series, with her female protagonist. Look

for her books soon at your local bookstore and airport.

Kathy Keane is Statewide Coordinator for California Least Tern monitoring for California Department of Fish and Game. She is working on publishing a paper that she presented at the Colonial Waterbirds meeting in 1996 on the survival factors that enhance recruitment of least terns. She is still working for the Port of Los Angeles doing Least Tern monitoring at the San Pedro site. The Port created 10 acres for a new Least Tern site ½ mile from existing site, building chick shelters and putting out decoys. At this site there were more nests, over 100, than in last 10 years at the other San Pedro site, as well as 25 Caspian Tern nests. Few predators had good reproductive success. Kathy also did some population monitoring at Batiquitos. She is also still running every day in order to keep up her energy to do so many different things.

John Konecny coordinated the monitoring of the California Least Tern colony at Mariner's Point during the ESPN X Games. He was lead on the 1997 bird monitoring study in the Western Salt ponds area in south San Diego Bay. Species he studied included the Black Skimmer, and Caspian, Elegant, Royal, Forster's and Least terns. He also monitored the bird populations at Batiquitos Lagoon with Kathy Keane. Finally, he was the USFWS coordinator for researchers from the Western Foundation and the Peregrine Fund who were studying Least Tern and Peregrine Falcon interactions in Long Beach and San Diego.

Pat Mock has been busy, having taken on a number of new projects. He is overseeing a regional conservation plan for the Palos Verdes Peninsula (LA Co.); is the lead biologist for the San Marcos (San Diego Co.) subarea conservation plan; and is a principal biologist involved in regional multi-species conservation plans for northwestern San Diego Co. and the Lower Colorado River. Pat is also initiating a wildlife corridor-monitoring program for a CALTRANS highway project in western Riverside Co. In addition, he teaches an introductory ecology course at UCSD and has been providing **Pat Baird** moral support for her politically-charged least tern monitoring project at the Mission Bay ESPN X-Games site. Other than all that, he has tons of free time!

Nancy Read is still monitoring the seabirds at Vandenberg Air Force Base. She found a total of 31 Brandt's Cormo-

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rant nests including one nest with depend young on August 26th. There were also seven Pelagic Cormorant nests visible, and there may have been more in inaccessible areas. There were successful nests of an unknown number of Pigeon Guillemots and Black Oystercatchers as well. Hopefully the question marks in these numbers will be cleared up next year when a longer-term study commences at the major colonies at Vandenberg.

Charlie Collins is finishing up many years' worth of studies on California Least Tern at Seal Beach and Camp Pendleton, and now has the prodigious task of writing it all up and publishing it! He is administering other California Least Tern and Western Snowy Plover monitoring projects, and is in his second year of a SeaGrant study on heavy metals in the tern ecosystem at Bolsa Chica wildlife preserve in the Huntington Beach area. He and **Mike Horn** are writing up that research. He is busy teaching and advising his many many graduate students.

Walter Wehtje is getting his Ph.D. in landscape ecology at the University of California Riverside. He is conducting research on patch dynamics and birds' distribution. He is trying to find out if distribution is based on preferable habitat or on social aspects. He is doing most of the work on San Nicholas Island, on Cactus Wrens that inhabit the coastal sage habitat. He is also working for the USFWS, conducting a land bird census San Nicholas Island via point counts, mist netting, and banding.

Pat Baird, as regional representative from PSG, commented on an EIR and an EIS for the City of Long Beach, and the U.S. Navy, regarding the destruction/moving of the west coast's largest colony of Black-crowned Night Herons on a decommissioned USN site being transferred to the City of Long Beach as a new port facility. This year, the majority of the colony did not return for reasons unknown, although at present there is a halt to cutting down the trees in which they nest.

She is meeting with a Long Beach city councilman to try to prevent the paving over and creation of a shopping center on a temporary wetlands at the Long Beach/Seal Beach boundary. This area is a rich stopping-off or wintering area for numerous species including black-necked stilts, American Avocets, Herring Gulls, Heermann's Gulls, Western Sandpipers, and many other species of shorebirds and

seabirds. She is also meeting with the same councilman in order to try to mitigate an extension of a major highway through a wetlands area in Long Beach. So far, no final plans have been made, but we are working on a compromise plan for a small diversion of the highway around the wetlands. As regional representative, she commented on an Environmental Assessment in support of the U.S. Fish and Wildlife-sponsored South San Diego Bay Refuge, an overlay refuge in a very busy port. This area has a variety of shorebird and seabird species which nest and overwinter there, and which is very important to the greater San Diego ecosystem.

Pat Baird also just completed a four-year foraging study on California Least Terns in the San Diego area. Since she is on a short sabbatical from teaching at California State University Long Beach, now she has the arduous task of writing up that research and earlier research that has sat in notebooks till the present. She also completed a detailed study on Least Tern behavior to disturbances caused by sports events in the Mission Bay area for ESPN. Her conclusion: "no wonder [L]east [T]erns are endangered; they spend so much energy getting off and on their nests all day, they can't make up the energy deficit from what they glean from the marine food web." She is currently also working on other grants and exercising her right brain by performing at various invited functions as part of a women's frame drumming group, Lipushiau.

K. David Hyrenbach is a graduate student in Biological Oceanography at Scripps Institute of Oceanography. This year he advanced to candidacy. His dissertation is on Black-Footed Albatrosses' habitat use off Southern California. He is collaborating with **Dick Veit** on the monitoring of seabird abundance and distribution within the CalCOFI grid. During the July cruise he tagged five Black Foots with ARGOS satellite tags and he plans to conduct additional work next summer. In addition to surveys off California, he spent part of the summer up in the SE Bering Sea working on Short-tailed Shearwater on a cruise with **George Hunt** (his thesis co-advisor).

Lisa Ballance and **Bob Pitman**, NMFS, Southwest Fisheries Science Center spent much of the last year sailing on dedicated marine mammal cruises, mostly in high latitudes: Bering Sea, Gulf of Maine, Antarctica, North Pacific gyre, but including two tropical areas: Southern Indian Ocean near Madagascar and in the

northern Gulf of California. They have also continued to analyze seabird data for tropical systems, focusing on the foraging ecology of Dark-rumped Petrel in the eastern Pacific. They are preparing for a big field season in 1998 during which they will be returning to the eastern tropical Pacific for an extensive four-month cruise in the fall. This will be the first of a three-year cruise. They will be watching for El Nino anomalies with respect to the seabird community at sea. Also planned is a visit to the Maldives in May.

Tim Burr, Resources Management Branch of the USN, is now in charge of all the Navy-associated biology at Camp Pendleton (San Diego County CA). He is in the midst of preparing next year's budget and trying to procure adequate money for research...no small task, akin to alchemy or viewing crystal balls. He attended the Wildlife Society meetings in Snowmass, Colorado in September.

Mike Horn continues to do research on foraging ecology of terns at Bolsa Chica (Huntington Beach, CA) and the Saltworks (San Diego, CA). He is working with **Darryl Smith**, a Sea Grant trainee, **Waslia Dahdul**, **Nancy Tham**, **Gwen Carreon** and **Lize Eriguel**, his students. He is also collaborating on trophic structure and heavy metal accumulation in Least Terns at Bolsa Chica and South San Francisco Bay with **Zed Mason** (California State University Long Beach) and **Charlie Collins** (California State University Long Beach).

Mike McCrary and **Mark Pierson**, MMS, hosted the Southern California Seabird Research regional conference on 6 June 1997. The meeting was well-attended. **Linda Dye**, **Kate** and **Bill Faulkner**, **Sean Hastings** and **Dan Richards** represented the Channel Islands Marine Sanctuary of the NPS, **Paul Kelly** from California Fish and Game and **Dan Robinette** and **Pat Baird** from California State University Long Beach were present, as well as a contingency from the USGS - **Bill McIver**, **Harry Carter** and **Darrell Whitworth** (BRD). The military was well-represented with **Grace Smith** and **Tom Keeney** (USN-Pt. Mugu) and **Nancy Read** (USAF-Vandenberg), and of course the USFWS-Ventura field office attended, represented by **Carl Benz**, **Kirk Waln**, **David Perekska**, **Jim Watkins**, **Robert Mesta**, and **Kate Symonds**.

The program was funded by the Naval Air Weapons Station (NAWS) at Point Mugu, and the main purpose was to review all seabird research in the Southern

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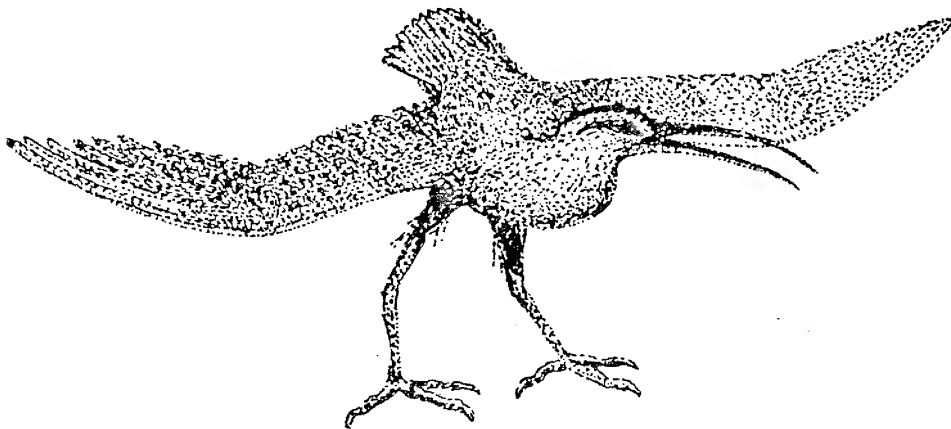
California Bight which was funded by the NAWS. The program lasted till mid-afternoon and consisted of the following brief papers: cormorant monitoring on San Nicholas Island; population status assessment of Xantus' Murrelets and Ashy Storm-Petrels; telemetry of Xantus' Murrelets; Breeding biology of Ashy Storm-Petrels; and roosting studies of Brown Pelicans. After lunch we discussed issues related to listing of the

Xantus' Murrelet and the Ashy Storm-Petrel, and other future research needs for all seabird species in the Southern California region.

Michael McCrary and **Mark Pier-son** have completed a three-year study on the seasonal abundance and distribution of shorebirds which use the sandy beaches in Ventura County. Michael is writing up the data for publication...never easy!! He and Mark have also completed 12 aerial

surveys of seabirds and marine mammals along the coast of southern California from northern Los Angeles County to southern San Luis Obispo County. These surveys are part of an ongoing research project that lasts through December 1998. Surveys will be flown every 6-8 weeks.

By **Pat Baird**, Long Beach, California



Courtesy Mark Rauzon, Berkeley, California

BULLETIN BOARD

PH.D. STUDENT POSITION AT OREGON STATE UNI- VERSITY TO STUDY SEA- BIRD RESTORATION

A Graduate Research Assistantship for a Ph.D. candidate is available for an individual interested in conducting research on factors influencing restoration of Pigeon Guillemots in the aftermath of the Exxon Valdez oil spill.

Applicants must have a M.S. in biology or related field and be available by April 1997 to begin preparations for field work. The successful applicant will be enrolled in the graduate program in the Department of Fisheries and Wildlife at Oregon State University in Corvallis. The Graduate Research Assistantship will provide tuition and stipend, in addition to covering costs of conducting research based at the Alaska SeaLife Center in Seward, Alaska.

The candidate will be expected to conduct both laboratory and field research on the effects of diet and ingested pollutants on growth and health of young guillemots. The primary objectives of the research are to (1) assess the role of diet composition on chick growth and (2) identify blood biomarkers of individual

health in the Pigeon Guillemot, a seabird species that has failed to recover from the direct effects of the 1989 Exxon Valdez spill. The approach will be to conduct controlled experiments with nestling guillemots raised in captivity at the SeaLife Center. The candidate must be willing to cooperate, coordinate, and collaborate with other scientists in the collection of lab and field data and the care of guillemots in captivity. Applicants must have a Masters degree in biology or related field. Individuals with previous field experience with seabirds and/or captive rearing of birds are especially encouraged to apply.

To apply for this position, please send a copy of your C.V., a letter expressing your interest in the position and how it fits into your career goals, copies of your transcripts, a copy of your GRE scores, and the names, addresses, and phone numbers of 3 references to:

Dan Roby, Assistant Unit Leader, Oregon Cooperative Wildlife Research Unit, Department of Fisheries and Wildlife, 104 Nash Hall, Oregon State University, Corvallis, Oregon 97331-3803 USA; Phone: 541-737-1955; Fax: 541-737-3590; Internet: robyd@ccmail.orst.edu

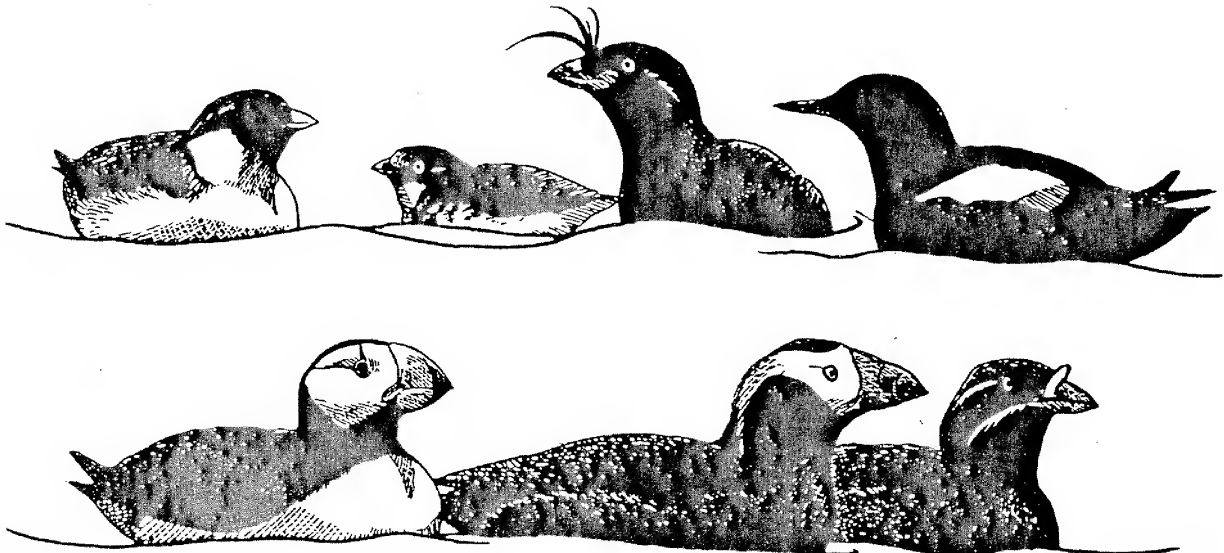
SCOTT JOHNSTON MOVES TO WASHINGTON, DC

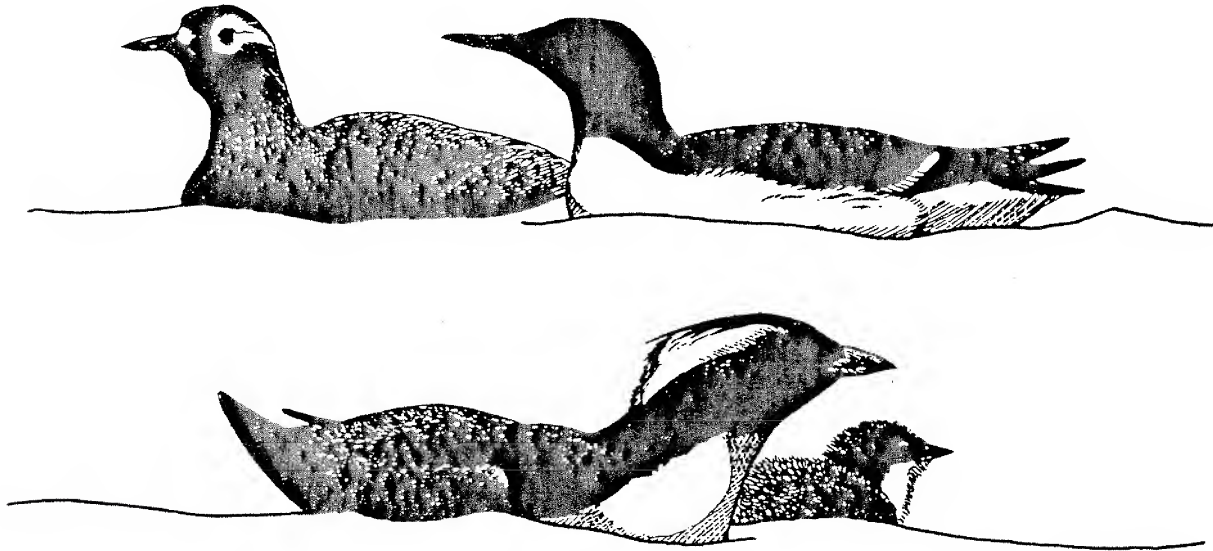
Scott Johnson has taken a job with the Endangered Species Division in the Fish and Wildlife Service's Washington DC office. He will be working in the listing department then moving on to the Recovery branch soon after.

His last day in Hawaii was November 6 and he started work in DC on November 19. His email will remain the same. His new address is: USFWS, Division of Endangered Species, 4401 N. Fairfax Drive, Room 452, Arlington, Virginia 22203, USA. Telephone number: 703-358-2171

VOLUNTEER POSITIONS IN THE BARREN ISLANDS, ALASKA

Two volunteers are needed to help with field work for a seabird study in the Barren Islands, Alaska, during 5 Jun - 20 Sep, 1998. We will collect information on the productivity of Common Murres, Black-legged Kittiwakes, and Tufted Puf-





J. Minnow
1994.

fins and the diets, feeding frequencies, and growth rates of their chicks. Rock climbing and boating are involved. The islands are isolated, rugged, wet, and windy. Applicants must be in excellent physical condition and able to make careful observations over long periods of time. Experience in marine environments is useful. Transportation and a stipend are provided.

If interested, please send a cover letter and resume to the field team leader: Arthur Kettle, Alaska Maritime National Wildlife Refuge, 2355 Kachemak Bay Drive / Suite 101, Homer, Alaska 99603-8021 USA. Telephone: (907) 235-6546. E-mail: Arthur_Kettle@mail.fws.gov

PETREL BIBLIOGRAPHY

A provisional bibliography of the Procellariiformes or petrels, a fully keyworded listing of 12,830 papers and books on these birds is now available on the internet at:
<http://www.zool.canterbury.ac.nz/jwbibl.htm>

It is in ASCII format and intended to be down-loaded into the user's PCs for searching by their own system. The work covers published material from Aristotle to 1995 inclusive. In due course a revised

version will be incorporate some of the estimated 4,000 citations evidently with data on petrels but not yet seen by me. These will be listed in a "WANTS" file at the above address. The finished version will also include indexes tying each keyword to all the citations bearing that keyword - in the style of the Zoological Record. The bibliography is available without charge (by me, anyway). John Warham, Zoology Department, University of Canterbury, P.B. 4800, Christchurch, New Zealand. E-mail: j.warham@zool.canterbury.ac.nz

ECOSYSTEM CONSIDERATIONS IN FISHERIES MANAGEMENT

The Alaska Chapter, North Pacific International Chapter and Western Division of the American Fisheries Society will hold their 1998 annual meetings jointly with the Wakefield Symposium. The theme for the entire meeting is Ecosystem Considerations in Fisheries Management. The meeting will take place 30 September -- 3 October 1998 in Anchorage, Alaska. To contribute an oral paper or poster submit abstracts by e-mail to FNBRB@uaf.edu by 15 January 1998.

For more information contact Brenda Baxter, Coordinator, Alaska Sea Grant College Program, University of Alaska, P.O. Box 755040, Fairbanks, AK 99775-5040, Telephone (907)474-6701, FAX (907)474-6285, WEB <http://www.uaf.edu/seagrant/Conferences/symposium.html>

MARBLED MURRELET RECOVERY PLAN

The U.S. Fish and Wildlife Service released the final Marbled Murrelet Recovery Plan in November 1997. The plan designated six Conservation Zones in Washington, Oregon, and California within which specific landscape-level management strategies need to be developed. The plan does not establish specific delisting criteria because further information on the biology of the murrelet is needed. The plan outlines research priorities and data required for developing delisting criteria. For a copy of the Recovery Plan contact Fish and Wildlife Reference Service, 5430 Grosvenor Lane, Suite 110, Bethesda, Maryland 20814, (800) 582-3421

OBITUARY

IN MEMORIAM: DANIEL D. MORIARTY

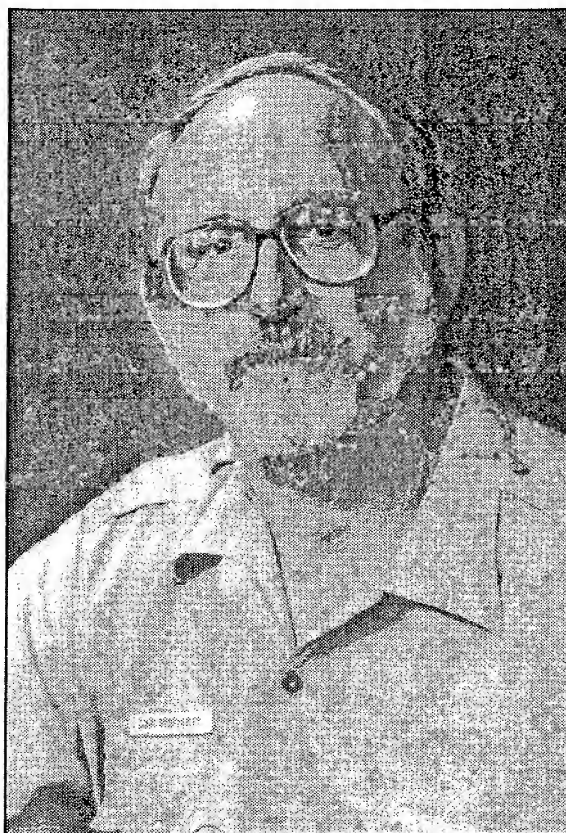
Friends and colleagues of Dan Moriarty were shocked and saddened by the news of his unexpected and sudden death from massive heart failure at his home in Honolulu on April 24. He was 55. Dan was a member of the Pacific Seabird Group for many years, and had done much to conserve and protect seabirds in Hawaii during the past two decades. Dan's catholic interests included all natural history from insectivorous plants to endangered waterbirds to meteors, as well as a wide variety of interests throughout the tropical Pacific, including Hawaii and New Guinea.

Born in Boston, Dan moved to Hawaii in 1961. From 1979 to 1990, Dan was the refuge manager at the idyllic Kilauea Point National Wildlife Refuge, Kauai, having taken over that position when Vernon Byrd returned to Alaska. Dan and his wife Linda lived at the former U.S. Coast Guard station at Kilauea Point for over a decade. They raised their children Mary, Hannah and Donald to the backdrop of weird, gurgling cries of Wedge-tailed Shearwaters, the wintertime clacking of Laysan Albatross beaks, the haunting jack-ass-like brays of nocturnal Newell's Shearwaters, and the spectacle of White-tailed and Red-tailed tropicbirds soaring along the steep cliffs.

Dan's work as a restoration ecologist was exemplary. For years before Dan took up the reins, Laysan Albatross had unsuccessfully been attempting to nest in North Kauai. Dan removed exotic shrubs on a hill overlooking the Pacific to create a lawn, fenced Kilauea Point to keep out feral dogs and cats, and thereby set the stage for the spontaneous establishment of the first historical Laysan Albatross colony in the main Hawaiian Islands. He planned and implemented the complete restoration of over 40 acres of former alien weeds, using native species propagated in a refuge nursery which produced over 300,000 potted plants each year.

In the late 1980s, Dan worked closely with the Trust for Public Land to acquire Crater Hill and Mokolea Point. This ex-

panded the refuge from 33 acres to more than 150 acres and added the nesting sites of Red-footed Boobies, tropicbirds and shearwaters. Dan quietly orchestrated a massive grass roots campaign, including PSG, to persuade Congress to fund the purchase. Among the unique problems that Dan overcame were roadblocks set by The Nature Conservancy, which then enjoyed a monopoly on brokering land acquisition projects in Hawaii and wanted to stymie the project of its competitor. Simultaneously Dan founded the Kilauea Point Natural History Association, a



flourishing non-profit group that generated private funds for developmental and education programs, and a highly successful volunteer program.

Dan's work was often recognized both within the government and by private conservation organizations. He was a finalist for the Department of the Interior's "Take Pride in America" award in 1987. He received the National Audubon Society's National Conservation Award in 1989, followed by the prestigious Chev-

ron National Conservation Award in 1990 when he was flown to Washington, D.C., to attend a national awards banquet.

As is all too often the case, Dan's exceptional achievements were not always appreciated by his agency. When Dan's children reached high school age, their educational needs required a move to Honolulu. The U.S. Fish & Wildlife Service assigned Dan, Hawaii's best land manager in our generation, to the Honolulu Airport to inspect the luggage of tourists for wildlife products. In early 1992, Dan resigned from FWS to become the natural resources officer at the Kaneohe Marine Corps Air Station, where his work included managing a large red-footed booby colony.

Since late 1993, Dan was responsible for natural resource conservation and protection on all Navy facilities in Hawaii, Japan, Korea, Guam and Diego Garcia. He oversaw the clean-up of Midway Islands before they were transferred to FWS as a wildlife refuge. Even in this position he enjoyed getting out in the field and doing land management tasks himself. For example, he recently built fences in the mountains encircling the naval magazine in Lualualei to keep feral goats and cattle from destroying endangered dry-lands plants. Just before his death, he had begun to ask me about restoring seabirds at Diego Garcia, Indian Ocean, whose populations have been ravaged by introduced rats.

Dan was a hard-working, straight-talking man who was admired by and inspired fierce loyalty from his colleagues. He was as loyal and as genuine a friend as can be found. He did not suffer the company of fools, nor did he abide the petty games played by those in the natural resource agencies who routinely swap personal career advantage over protecting and conserving wildlife. Those who knew and worked with Dan miss him enormously, but the real losers are seabirds and other wildlife.

By *Craig S. Harrison*, Washington, DC

REPORT OF THE TREASURER – 1997

REPORT OF THE TREASURER OCTOBER 1, 1996 TO SEPTEMBER 30, 1997

The gross income for the year was \$72,524.24 of which \$32,470.16 (44%) was income from the Portland annual meeting. A grant for \$18,000 (24%) was received from the National Biological Service for the Seabird Monitoring Database project. Regular membership dues accounted for \$8,099.21 (11%), life members contributed \$1,100 which was deposited in the endowment fund, and library subscriptions to *Pacific Seabirds* garnered \$565. Interest on our savings account was \$3,036.15 and capital gains, interest and dividend income from the endowment fund accounts amounted to \$2,569.52. Income from publication sales was \$947. Fundraising activities (auctions, raffle and hat sales) at the Portland meeting totaled \$4,677.20, fund raising expenses were \$1,248.77 and as a result \$3,428.43 was transferred to the PSG endowment.

Expenses totaled \$73,005.24 with the Seabird Monitoring Database project being our largest expense at \$31,500 (43%). The additional \$13,500 expense for this project not covered in this year's grant was paid from funds received by PSG in previous years. This additional fund outlay accounts for this year's expenses being greater than our income. The annual meeting expenses were \$30,918.96 (42%). The EVOS project expended \$2,115.56 on production of the

workshop proceedings. The cost of running PSG was \$8,267.09 (11%) with the biggest expense being the production of two issues of *Pacific Seabirds*, \$5,884.16. Officer and committee expenses were low this year, \$622.93; the institutions with which the officer's are affiliated picked up many of the incidental expenses. Other expenses involved in running PSG were \$1,050 for director's insurance, \$650 for dues to the Ornithological Council and American Bird Conservancy, and \$10 tax filing fee. The expenses for running PSG this year (\$8,267.09) almost equaled our revenue from membership fees and library subscriptions (\$8,664.21).

Endowment Accounts

On September 30, 1997 the PSG endowment was worth \$74,972.67. A total of \$64,688.34 has been deposited in the endowment account since its inception. On a regular basis throughout the year the endowment committee (Malcolm Coulter, Craig Harrison and Jan Hodder, treasurer) have converted shares of Dean Witter U.S. Government Securities Trusts to shares in the Neuberger & Berman Management Inc.'s Guardian Fund. The investment objective of the no-load Guardian Fund is to seek capital appreciation, and secondarily current income. The fund, established in 1950, invests primarily in a

large number of common stocks in long established, high quality companies in a diversity of industries. The average annual total return for the past three years has been 25.3%, and since inception 13.5%. This past year the fund posted a 39% return. This year we have transferred \$37,000 from Dean Witter to the Guardian Fund leaving 731 shares which will be transferred in the new fiscal year. In addition to these 731 shares (value on Sept 30, 1997 was \$9.04/share, totaling \$6,608.24,) we own 2,099 shares in Neuberger & Berman Management Inc.'s Guardian Fund (value on Sept 30, 1997 was \$32.57/share, totaling \$68,364.43).

Membership

As of September 30, 1996 PSG membership totaled 470, of which 57 are life members, 26 are family members and 69 are student members. One hundred and twenty-three new members have joined PSG this year, 97 of these joined as a result of attending the Portland meeting, 8 people used the form from the back page of *Pacific Seabirds*, and 7 people used the form from the web page. A total of 81 members did not renew his year. Fifty libraries receive *Pacific Seabirds* of which 23 have paid subscriptions.

Submitted by *Jan Hodder*, PSG Treasurer

REPORT OF THE TREASURER

Table 1. Pacific Seabird Group Balance Sheet, September 30, 1997

Account	Balance	
	September 30, 1997	September 30, 1996
Annual Meeting - Portland		\$1,500.00
Annual Meeting - Monterey	\$2,000.00	
¹Endowment Accounts		
Dean Witter US Gov. Securities	\$9,024.18	\$45,106.94
Neuberger and Berman Guardian Fund	\$55,696.79	\$12,626.93
Pacific Seabirds Account (S. Speich ed.)	\$3,210.16	\$168.20
Savings Account - Dean Witter	\$17,603.85	\$32,416.77
Special Projects Accounts		
EVOS Workshop and Publication	\$16,302.94	\$17,619.43
Treasurer's Checking Account	\$3,472.53	\$1,713.97
² United Kingdom Membership Account	\$449.36	\$225.29
Total Assets	\$107,759.81	\$111,377.53
Liabilities and Equity		
³ Liabilities	\$16,302.94	\$29,619.43
Equity	\$91,456.87	\$81,758.10
Total Liabilities and Equity	\$107,759.81	\$111,377.53

Footnotes

¹ Total reflects actual amount deposited and interest or capital gains earned. Deposits are made by purchasing shares, the dollar amount of which fluctuates with the market. Total value of deposits to the PSG endowment accounts on September 30, 1997 was \$64,720.97. On September 30, 1997 we had 731 shares of Dean Witter U.S. Government Securities trust valued at \$9.04 per share (value \$6,608.24), and 2,099 shares of Neuberger and Berman's Guardian Fund at \$32.57 per share (value \$68,364.43). Total value of shares on September 30, 1997 was \$74,972.67. If assets and equity are calculated using these share prices instead of the dollars deposited, the balance sheet totals for 1996/97 would be \$117,562.15 and \$101,259.21 respectively compared with the October 1 1995 - September 30, 1996 totals of \$109,162.55 and \$79,543.12 respectively.

² The United Kingdom account is managed by Mark Tasker and is used for deposits of membership dues paid in pounds sterling. A conversion rate of £1.00 to \$1.61 was used.

³ \$16,302.94 for the EVOS publication.

REPORT OF THE TREASURER

Table 2. Pacific Seabird Group Cash Flow Report, 1 October 1996 - 30 September 1997

Income	
Annual meeting - Portland	
Registration and banquet fees	\$30,853.31
Fundraising	\$4,677.20
Profit from the general meeting	\$1,616.85
Capital Gains (Endowment account Neuberger & Berman)	\$1,220.12
Grant from the USFWS for the Seabird Monitoring Database project	\$18,000.00
Gifts for the PSG endowment	\$50.00
Income dividend (Savings account Dean Witter)	\$2,187.08
Income dividend (Endowment account Dean Witter)	\$1,088.09
Income dividend (Endowment account Neuberger & Berman)	\$261.31
Interest earned on checking accounts	\$849.07
Life membership dues	\$1,110.00
Loan Repayment from Portland meeting	\$1,000.00
Membership dues	\$8,099.21
Library Subscriptions	\$565.00
Publication sales	\$947.00
Total Income	\$72,524.24
Expenses	
Annual meeting - Portland	
Meeting and banquet expenses	\$26,872.19
Loan Repayment to PSG Savings account	\$1,000.00
PSG Memberships	\$1,798.00
Fundraising expenses	\$1,248.77
Bank charges	\$50.00
Director's Insurance	\$1,050.00
¹ Dues	\$650.00
EVOS Workshop	\$2,115.56
Investment Expense (Endowment account Dean Witter)	\$87.44
Officer and Committee expenses	\$622.93
<i>Pacific Seabirds</i>	\$5,884.16
Publications	\$116.19
Seabird Monitoring Database	\$31,500.00
Taxes	\$10.00
Total Expenses	\$73,005.24
Total Expenses over Income	\$481.00

Footnote

¹ Ornithological Council \$500, American Bird Conservancy \$150.



A SYMPOSIUM OF THE PACIFIC SEABIRD GROUP
BIOLOGY OF MARBLED MURRELETS: INLAND AND AT SEA
S. KIM NELSON AND SPENCER G. SEALY (editors)

in NORTHWESTERN NATURALIST, Volume 76, Number 1, 1995

CONTENTS

Introduction by S. K. Nelson and S. G. Sealy

Inland

Marbled murrelet activity relative to forest characteristics in the Naked Island Area, Prince William Sound, Alaska by K. J. Kuletz, D. K. Marks, N. L. Naslund and M. B. Cody

Tree and habitat characteristics and reproductive success at marbled murrelet tree nests in Alaska by N. L. Naslund, K. J. Kuletz, M. B. Cody and D. K. Marks

Description of two marbled murrelet tree nests in the Walbran Valley, British Columbia by I. A. Manley and J. D. Kelson

Characteristics of three marbled murrelet tree nests, Vancouver Island, British Columbia by K. M. Jordan and S. K. Hughes

Marbled murrelet distribution in the Siskiyou National Forest of southwestern Oregon by C. P. Dillingham, R. C. Miller and L. O. Webb

Two marbled murrelet nest sites on private commercial forest lands in northern California by S. J. Kerns and R. A. Miller

Behavior of marbled murrelets at nine nest sites in Oregon by S. K. Nelson and R. W. Peck

Fledging behavior, flight patterns, and forest characteristics of marbled murrelet tree nests in California by S. W. Singer, D. L. Suddjian and S. A. Singer

Use of boat-based surveys to determine coastal inland habitat associations of marbled murrelets in Prince William Sound, Alaska by D. K. Marks, K. J. Kuletz and N. L. Naslund

Use of radar to study the movements of marbled murrelets at inland sites by T. E. Hamer, B. A. Cooper and C. J. Ralph

At Sea

Preliminary observations on juvenile:adult ratios of marbled murrelets in Auke Bay, southeast Alaska by H. L. Anderson and S. R. Beissinger

At-sea activity patterns of marbled murrelets adjacent to probable inland nesting areas in the Queen Charlotte Islands, British Columbia by M. S. Rodway, J.-P. L. Savard, D. C. Garner and M. J. F. Lemon

Decline of marbled murrelets in Clayoquot Sound, British Columbia: 1982-1993 by J. D. Kelson, I. A. Manley and H. R. Carter

Distribution of marbled murrelets along the Oregon Coast in 1992 by C. S. Strong

Use of mist nets to capture murrelets over the water by R. A. Burns, G. W. Kaiser and L. M. Prestash.

To Order: send \$20.00 USD (postage and handling included), check or money order, made payable to the Pacific Seabird Group, to Jan Hodder, Treasurer, Pacific Seabird Group, Oregon Institute of Marine Biology, University of Oregon, Charleston, OR 97420 USA. Government and institution purchase orders accepted.

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PUBLISHED PROCEEDINGS OF SYMPOSIA OF THE PACIFIC SEABIRD GROUP

At irregular intervals the Pacific Seabird Group holds symposia at its annual meetings. Published symposia are listed below. Available symposia may be purchased by sending a check or money order (in US Dollars, made payable to Pacific Seabird Group) to Jan Hodder, Treasurer, Pacific Seabird Group, Oregon Institute of Marine Biology, University of Oregon, Charleston, Oregon 97420 USA. Prices include postage (surface rates) and handling. See the following membership application/publication order form to order symposia.

SHOREBIRDS IN MARINE ENVIRONMENTS. Frank A. Pitelka (Editor). Proceedings of an International Symposium of the Pacific Seabird Group. Asilomar, California, January 1977. Published June 1979 in Studies in Avian Biology, Number 2. Out of print.

TROPICAL SEABIRD BIOLOGY. Ralph W. Schreiber (Editor). Proceedings of an International Symposium of the Pacific Seabird Group, Honolulu, Hawaii, December 1982. Published February 1984 in Studies in Avian Biology, Number 8. \$12.00.

MARINE BIRDS: THEIR FEEDING ECOLOGY AND COMMERCIAL FISHERIES RELATIONSHIPS. David N. Nettleship, Gerald A. Sanger, and Paul F. Springer (Editors). Proceedings of an International Symposium of the Pacific Seabird Group, Seattle, Washington, January 1982. Published 1984 as Canadian Wildlife Service, Special Publication. Out of print.

ECOLOGY AND BEHAVIOR OF GULLS. Judith L. Hand, William E. Southern, and Kees Vermeer (Editors). Proceedings of an International Symposium of the Colonial Waterbird Society and the Pacific Seabird Group, San Francisco, California, December 1985. Published June 1987 in Studies in Avian Biology, Number 10. \$18.50.

AUKS AT SEA. Spencer G. Sealy (Editor). Proceedings of an International Symposium of the Pacific Seabird Group, Pacific Grove, California, December 1987. Published December 1990 in Studies in Avian Biology, Number 14. \$16.00.

STATUS AND CONSERVATION OF THE MARBLED MURRELET IN NORTH AMERICA. Harry C. Carter, and Michael L. Morrison (Editors). Proceedings of a Symposium of the Pacific Seabird Group, Pacific Grove, California, December 1987. Published October 1992 in Proceedings of the Western Foundation of Vertebrate Zoology, Volume 5, Number 1. \$20.00.

THE STATUS, ECOLOGY, AND CONSERVATION OF MARINE BIRDS OF THE NORTH PACIFIC. Kees Vermeer, Kenneth T. Briggs, Ken H. Morgan, and Douglas Siegel-Causey (Editors). Proceedings of a Symposium of the Pacific Seabird Group, Canadian Wildlife Service, and the British Columbia Ministry of Environment, Lands and Parks, Victoria, British Columbia, February 1990. Published 1993 as Canadian Wildlife Service, Special Publication, Ministry of Supply and Services, Canada, Catalog Number CW66-124-1993E. Free. Write: Publications Division, Canadian Wildlife Service, Ottawa, Ontario, K1A 0H3, Canada.

BIOLOGY OF MARBLED MURRELETS - INLAND AND AT SEA. S. Kim Nelson and Spencer G. Sealy (Editors). Proceedings of a Symposium of the Pacific Seabird Group, Seattle, Washington, February 1993. Published 1995 in Northwestern Naturalist, Volume 76, Number 1. \$20.00.

Pacific Seabird Group Symposia are initiated by one or more persons with interest in a particular topic area, resulting in a collection of papers usually presented at an annual meeting of the Pacific Seabird Group. Some symposia are further refined and then published as a Symposium of the Pacific Seabird Group. Individuals interested in promoting future symposia must first contact the Coordinator of the Publications Committee, and the appropriate annual meeting scientific program coordinator, prior to initiating the process leading to the actual symposium session and possible publication. The necessary guidelines outlining the steps and responsibilities for obtaining approval, organizing, holding and publishing Pacific Seabird Group Symposia will be provided. This opportunity is available to all members of the Pacific Seabird Group.

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Exxon Valdez Oil Spill Seabird Restoration Workshop

Restoration Project 95038
Final Report

Edited by:

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September 1997



Pacific Seabird Group Technical Publication Number 1

[The Pacific Seabird Group seeks manuscripts suitable for the Pacific Seabird Group Technical Publication series. Manuscripts, to long for publication in *Pacific Seabirds*, dealing with any aspect of the biology or conservation of marine birds or their environment will be considered for publication. Interested potential authors should contact The Editor prior to submission of manuscripts.]

BOOK REVIEWS

BOOK REVIEWS AND RECENT LITERATURE

SEABIRD BYCATCH REDUCTION: NEW TOOLS FOR PUGET SOUND DRIFT GILLNET SALMON FISHER- IES: THE 1996 SOCKEYE AND CHUM SALMON TEST FISHERIES FINAL REPORT

By Edward F. Melvin, Loveday L. Conquest, and Julia K. Parrish. 1997. Washington Sea Grant Program. Project A/FP-7. WSG-AS-97-01. University of Washington, Seattle, Washington, USA.

Washington Sea Grant, University of Washington, recently published a report entitled: Seabird Bycatch Reduction: New Tools for Puget Sound Drift Gillnet Fisheries by Ed Melvin, Loveday Conquest and Julia Parrish. The report summarizes the results of our 1995-1996 research developing methods that eliminate or significantly reduce the incidental capture of seabirds in salmon gillnet fisheries without significantly reducing the fishing efficiency of the nets. This work continued a university - industry research program begun in the 1994 in cooperation with the Washington Department of Fish and Wildlife.

The report provides a summary of (1) the status of Common Murres and Rhinoceros Auklets populations affected by Puget Sound gillnet fisheries (2) observations of seabirds and marine mammals near nets during fishing activities and from seabird transects on the fishing grounds, (3) comparisons of salmon catch rates and seabird marine mammal entanglement rates by gear type, time of day, and location, (4) comparisons of several management scenarios and their effect on seabird bycatch in these fisheries, and (5) recommendations for management. Management recommendations include:

- Make seabird conservation an objective of all fishery management agencies with jurisdiction over Puget Sound and its adjacent waters.
- Implement seabird bycatch reduction measures that are comprehensive, extending to all fishers regardless of country or treaty status.
- Link seabird data from existing on-colony and outer coast and Puget Sound survey programs with seabird abundance data collected on the fishing grounds.

- Prioritize the development of a comprehensive seabird abundance data set and incorporate it into the fishery management process via wildlife management agencies responsible for seabird conservation.

- Manage the fishery interactively using real time seabird and fish abundance data.

- Eliminate morning change-of-light sets in the gillnet fishery and restrict fishing to daylight hours in years of high murre abundance.

- Require 20 Mesh nets (upper 20 meshes replaced with white, highly visible seine twine) to replace traditional monofilament drift gillnets in the Area 7/7A Fraser River sockeye fishery, and allow time for full compliance. Several of these management recommendations were adopted by the Washington Fish and Wildlife Commission for management of the non-tribal sockeye fishery beginning in 1997. We hope to do additional work with acoustic alerts (pingers) if funding can be identified.

The executive summary and ordering information is available on the Washington Sea Grant Program Internet Home Page at:

<http://www.wsg.washington.edu/pubs/acquisitions.html>

By *Ed Melvin*, Marine Fisheries Specialist, Washington Sea Grant Program 3716 Brooklyn Ave NE, Seattle, WA 98105 USA; on campus Box 355060. Voice: (206) 543-9968; FAX (206) 685-0380.

A PROVISIONAL BIBLIOGRAPHY OF THE PROCELLARIIFORMES OR PETRELS

By John Warham. [Article reprinted from the John Warham, petrel bibliography web site:

<http://www.zool.canterbury.ac.nz/jwbi/bpl.htm>]

This listing of publications in the style of ZOOLOGICAL RECORD (1864-) on albatrosses, shearwaters and other petrels, is intended to be imported into the users' own PCs for searching by their own sys-

tems. I have stopped adding papers from the journals later than 1995 unless in very 'way-out' periodicals, the time scale being from Aristotle to 1995 incl., but the user can add later publications as required. Some books and symposia volumes post-1995 have, however been included. The present is but a provisional listing.

Besides the present explanatory HTML file, TWO files are essential: 1) The main text file (AT.ZIP) listing 12,830 papers and books alphabetically by authors' names; 2) A file giving the keywords (KEYWORDS.ZIP) used to describe the contents of each publication.

To Download the bibliography and associated files can be downloaded from the site (see above).

Eventually c.4000 other references not presently available to me will be added as well as a series of indexes tying each keyword to all the publications carrying that keyword, e.g. CAMPBELL I.: Bailey & Sorensen, 334; Robertson, 10270; Sorensen, 5686, and so on. Some keywords may need changing and there will be other minor alterations. A list will also be included of titles evidently containing data on tubenoses but still not seen by me. Main needs now are for many small notes in local natural history or scientific societies (especially in France and the U.K.), some early Russian titles listed by Bianchi (1913) and Scandinavian ones given by Sundevall (1885).

Many hands have transcribed this material so typographic errors have crept in - hopefully most will be corrected in the revised version.

Only published material is included. Unpublished theses are omitted (although published abstracts are if containing data), and so are most field guides. Scientific names mainly follow those given by Jouanin & Mougin in the 2nd edition of "Birds of the World" (vol. 2, 1979). Sub-specific names are not keyworded separately partly owing to past name-splitting and partly because of uncertainties about the validity and relationships of many taxa. To some extent subspecies references could be found from a combined search for the species name and an appropriate geographical one. For example, a search of *D.melanophrys* and Campbell I. would throw up many, but by no means all, citations for *D.m.impavida*, as this

BOOK REVIEWS

bird only breeds there. In searching via keywords note spellings, e.g. FEEDING:BEHAVIOUR, and constructions, e.g. S.AMERICA [PACIFIC]: using S.AMERICA[PACIFIC] may not work.

The fields used are:

1. AUTHor;
2. DATE;
3. TITLE;
4. SOJL (journal or book);
5. SUBJect keywords;
6. GEOGraphical keywords;
7. PALAeontological keywords;
8. SYSTematic keywords;
9. VALUe (a rating on the scale of 1-3 with 1 being a major contribution, 3 a minor one);
10. Number.

The VALUe gradings of a citation's usefulness to today's zoologists have been allotted at the time of entry into the data base. This has been going on since 1980, so quite a few citations then graded as 1 or 2 would have been downgraded had they been entered today (1997), more

recent work having improved on the earlier studies. And as each citation was automatically numbered when entered into the databank, entries are not numbered from start to finish.

Little attempt has been made to assess the accuracy of the information in these various publications. In particular, it should not be assumed that identifications, particularly of birds at sea, are always correct. Many earlier papers were either not refereed or inadequately so by today's standards. It is not always possible to determine to what species some early writers were referring. Here, and elsewhere where identification down to species was impossible, the keyword is shown as, e.g. *Puffinus* sp., etc.

This bibliography has been assembled over about 15 years and many months of work have been involved. Many seabird workers, librarians and granting agencies have helped in amassing the material: they will be fully acknowledged in the revised version. Initially a Prime 250 computer was used and in the result there are no diacritical marks and italics are

indicated by lower case letters. The work is intended to be made available without charge (by me, anyway) and the reprints and xeroxes are being shipped to the Alexander Library of the Edward Grey Institute housed in the Oxford University Zoology Dept.

Please notify me of any errors you encounter. Where papers or significant material in books have been missed PLEASE POST a photocopy to me at the address given below. With extracts from books please include the title page and ensure that the editor(s) are listed, also the publisher's name, place of publication, and number of pages in the volume. Do not ask me about computing matters - I'm computer illiterate. (10 Aug. 1997)

By **John Warham**, Department of Zoology, University of Canterbury, PB 4800 Christchurch, New Zealand. E-mail: j.warham@zool.canterbury.ac.nz
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Contact committee coordinators for information and activities of committees and how you can participate.

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